

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

AMERICAN STEWARDS OF	§	
LIBERTY, et al.	§	
Plaintiffs,	§	
	§	No. 15-cv-1174-LY
v.	§	
	§	
UNITED STATES FISH & WILDLIFE	§	
SERVICE, et al.	§	
Federal Defendants.	§	

**FEDERAL DEFENDANTS' INDEX OF EXHIBITS IN SUPPORT OF THEIR CROSS-
MOTION FOR SUMMARY JUDGMENT AND OPPOSITION TO PLAINTIFFS'
MOTION FOR SUMMARY JUDGMENT [DKT NO. 132]**

Exhibit 1 - M002516-23

Email Attachment, Bone-Cave-Harvestman-Literature-Rationale_clean.docx

Exhibit 2 - M002858-59

Email from Smith-Castro to Crouse, Re: FR2856: Bone Cave Harvestman

Exhibit 3 - M003019-20

Email from McGee to Jacobsen, Re: Bone Cave Harvestman 90-day

Exhibit 4 - M003021-22

Email from Zerrenner to Warriner, Fwd: Bone Cave 90-day justification

Exhibit 5 - M003023-24

Email from McGee to Zerrenner, Re: Bone Cave 90-day justification

Exhibit 6 - M003025

Email Attachment, Bullet Points for RD.docx

Exhibit 7 - M003026-28

Email from Warriner to McGee, Re: Bone Cave 90-day justification

Exhibit 8 - M003029-30

Email from McGee to Koch, Re: Bone Cave 90-day justification

Exhibit 9 - M003031

Email Attachment, Bullet Points for RD - Bone Cave 90-day

Exhibit 10 - M003032-34

Email from McGee to Koch, Bullet Points for RD - Bone Cave 90-day

Exhibit 11 - M003035

Email Attachment, Bullet Points for RD_v3.docx

Exhibit 12 - M003043 - 65

Email Attachment, Briefing-Bone-Cave-Harvestman-2017.pptx

Exhibit 13 - M003088-102

Email Attachment, Briefing-Bone-Cave-Harvestman-2017-jlm.pptx

Exhibit 14 - M003264-78

Email Attachment, Briefing-Bone-Cave-Harvestman-2017-90-day.pptx

Exhibit 15 - M003393-424

90-Day Finding on a Petition to Remove the Bone Cave Harvestman from the List of Endangered and Threatened Wildlife

Exhibit 16 – M003425-42

Email Attachment, Bone Cave harvestman 90-day finding_PRF_signed_3-20-2017.pdf

Exhibit 17 - M003657-70 (reformatted from M002525-87)

Email Attachment, Bone-Cave-Harvestman-Petition-Literature-Annotated_clean.xlsx

Exhibit 18 - R001734-1830

Taylor, S.J., J.K. Krejca, and K. Hackley. 2007. Examining possible foraging distances in urban and rural cave cricket populations: carbon and nitrogen isotope ratios ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) as indicators of trophic level. Illinois Natural History Survey Technical Report 2007(59):1-97.

Exhibit 19 - R002496-2581

Ubick, D., and T.S. Briggs. 1992. The harvestman family Phanlangodidae. 3. Revision of Texella Goodnight and Goodnight (Opiliones: Laniatores). Texas Memorial Museum, Speleological Monographs, 3:155-240.

Exhibit 20 - R002623-36

Service (US Fish and Wildlife). Rev. 2014. Karst Preserve Management and Monitoring Recommendations. 12 pp.

Exhibit 21 – R004776-79

Service (US Fish and Wildlife) 1983. Endangered and Threatened Wildlife and Plants; Final Rule To Remove the Florida Population of the Pine Barrens Treefrog From the List of Endangered and Threatened Wildlife and To Rescind Previously Determined Critical Habitat.

Exhibit 22 - R004889-5050

Service (US Fish and Wildlife) 1994 Endangered Karst Invertebrates Recovery Plan for Travis and Williamson Counties.

Exhibit 23 - R005051-54

Service (US Fish and Wildlife) 1994 Endangered and Threatened Wildlife and Plants; 90-day Finding on a Petition To Delist Seven Texas Karst Invertebrates.

Exhibit 24 - R005236-59

Service (US Fish and Wildlife) 2009. Bone Cave Harvestman: 5 Year Review and Evaluation

Dated: December 15, 2017

Respectfully Submitted,
JEFFREY H. WOOD
Acting Assistant Attorney General
SETH M. BARSKY, Chief
MEREDITH L. FLAX, Assistant Chief

/s/ Lesley Lawrence-Hammer
LESLEY LAWRENCE-HAMMER, Trial
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U.S. Department of Justice
Environment & Natural Resources Division
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Attorneys for Federal Defendants

OF COUNSEL
FRANK LUPO, Attorney Advisor
U.S. Department of the Interior, Office of the Regional Solicitor

Defense Exhibit 1

**United States Department of the Interior
U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758**

Memorandum

To: File

From: Michael Warriner

Date: January 18, 2017

Subject: Categorization of literature cited or provided with June 2014 Petition to Delist the Endangered Bone Cave Harvestman, Travis and Williamson Counties, Texas. Literature categorized as to relevance and application to 90-day finding.

I. Petition literature evaluated and cited in text of 90-day finding.

Morrison, L. W. 2002. Long-term impacts of an arthropod-community invasion by the imported fire ant, *Solenopsis invicta*. Ecology 83:2337-2345.

Porter, S. D. and D. A. Savignano. 1990. Invasion of polygyne fire ants decimates native ants and disrupts arthropod community. Ecology 71:2095-2106.

Reddell, J. 1993. Response to the Petition to Delist Seven Endangered Karst Invertebrates. (Unpublished data) Dated July 10, 1993; Received by the USFWS on July 12, 1993.

United States Fish and Wildlife Service (USFWS). 1988. Endangered and Threatened Wildlife and Plants; Final Rule to Determine Five Texas Cave Invertebrates to be Endangered Species. September 16, 1988. Federal Register 53(180): 36029-36033.

United States Fish and Wildlife Service (USFWS). 1993. Endangered and Threatened Wildlife and Plants; Coffin Cave Mold Beetle (*Batrissodes texanus*) and Bone Cave Harvestman (*Texella reyesi*) Determined to be Endangered. August 18, 1993. Federal Register 58(158): 43818-43820.

United States Fish and Wildlife Service (USFWS). 1994a. Recovery plan for endangered karst invertebrates in Travis and Williamson counties, Texas. 25 August 1994. USFWS Region 2 Office, Albuquerque, NM. 154 pp.

United States Fish and Wildlife Service (USFWS). 1994b. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to Delist Seven Texas Karst Invertebrates. March 14, 1994. Federal Register 59(49): 11755-11758.

United States Fish and Wildlife Service (USFWS). 2009. 5-Year Review: Bone Cave Harvestman (*Texella reyesi*). USFWS Austin Ecological USFWS Field Office, Austin, TX. 22 pp.

II. Petition literature reviewed but not cited in 90-day finding. The petition contends that this literature supports the assertion that 94 Bone Cave harvestman-occupied caves (mitigation preserve land) are

currently providing significant protection for the species. Based on staff review of preserve areas identified in the petition, 21 locations have some potential to meet U.S. Fish and Wildlife Service Karst Preserve Design Recommendations. However, additional information is lacking (e.g., delineated surface and subsurface drainage basins, adequate cave cricket foraging areas, exact cave locations, absence of pipelines, storage tanks, and other features that could serve as contamination sources) to formally recognize these areas as karst fauna areas contributing to the recovery of the Bone Cave harvestman. [See 80 FR 30992-30993]

Elliott, W.R. 1992. Endangered and rare karst species in Travis County, Texas: options for the Balcones Canyonlands Conservation Plan. Unpub. Rept. For Balcones Canyonlands Conservation Plan, U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department, and Texas Nature Conservancy. 12 pp. + tables.

H. Co. Simon Lakeline Mall Partnership. Undated. Habitat Conservation Plan: Lakeline Mall, Austin, Texas.

Mowad, Gary. 2011. Letter to Michael Leary, Director, Planning and Program Development for Consultation No. 21450-2006-F-0132. December 09, 2011.

Regional Environmental Consultants (RECON) and U.S. Fish and Wildlife USFWS (USFWS). 1996. Habitat Conservation Plan and Final Environmental Impact Statement Balcones Canyonlands Preserve, Austin, Texas. City of Austin and Travis County, Texas. March 1996.

SWCA Environmental Consultants (SWCA). 2002. Environmental Assessment/Habitat Conservation Plan for issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the incidental take of the golden-cheeked warbler (*Dendroica chrysoparia*) during the construction and occupation of a residential development on portions of the 193-acre Russell Park Estates, Williamson County, Texas. July 02, 2002.

SWCA Environmental Consultants, et al. (SWCA et al.) 2008. Williamson County Regional Habitat Conservation Plan. Prepared for the Williamson County Conservation Foundation, the Honorable Lisa Birkman, President and Commissioner, Precinct 1. SWCA Project No. 10622-139-AUS. August 15, 2008.

Texas Cave Conservancy (TCC). 2012. Cave management activities Brushy Creek Municipal Water District Round Rock, Texas -02012 report

Texas Cave Conservancy (TCC). 2012. Cave Preserves #1 and #2. Accessed 01/28/14 from: http://www.texascaves.org/preserves_1

Texas Cave Management Association (TCMA). 2014. 2013 TCMA Caves Preserves Report; compiled by Jim Kennedy, TCMA Preserves Chair. January 10, 2014.

Travis County Department of Transportation and Natural Resources, Natural Resources and Environmental Quality Division and City of Austin BCP—Austin Water Utility (Travis County, et. al). 2012. Balcones Canyonlands Preserve Karst Monitoring and Management FY 2012 Annual Report (October 1, 2011-September 30, 2012).

United States Fish and Wildlife Service (USFWS) 1995. Environmental Assessment/Habitat

Conservation Plan for Issuance of an Endangered Species Act Section 10 (a)(1)(B) permit for the incidental take of the golden cheeked warbler (*Dendroica chrysoparia*), Tooth Cave ground beetle (*Rhadine persephone*), and Bone Cave harvestman (*Texella reyesi*) during construction and operation of a mixed use and residential development on portions of the 333-acre FOUR POINTS PROPERTY, Austin, Texas. November 13, 1995.

United States Fish and Wildlife Service (USFWS) 1999. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10 (a)(1)(B) permit for the incidental take of golden cheeked warbler (*Dendroica chrysoparia*), Black-capped Vireo (*Vireo atricapillus*), Tooth Cave pseudoscorpion (*Tartarocreagis texana*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), Bee Creek Cave harvestman (*Texella reddelli*) Bone Cave harvestman (*Texella reyesi*), Tooth Cave spider (*Neoleptoneta myopica*), Tooth Cave ground beetle (*Rhadine persephone*), and species of concern, Jollyville Plateau Salamander (*Eurycea* sp.) and Bifurcated Cave Amphipod (*Stygobromus bifurcates*) during the construction and operation of residential and commercial development on portions of the approximately 550.3-acre GRANDVIEW HILLS property, Austin, Travis County, Texas. April 1999, Revised June 1999.

United States Fish and Wildlife Service (USFWS) 2000. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10 (a)(1)(B) permit for the incidental take of golden cheeked warbler (*Dendroica chrysoparia*), Tooth Cave pseudoscorpion (*Tartarocreagis texana*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), Bone Cave harvestman (*Texella reyesi*), Tooth Cave spider (*Neoleptoneta myopica*), and Tooth Cave ground beetle (*Rhadine persephone*), during the construction and operation of residential and commercial development on portions of the approximately 446-acre COMANCHE CANYON RANCH, INC. property, Austin, Travis County, Texas. June 21, 2000.

United States Fish and Wildlife Service (USFWS) 2001. Environmental Assessment/Habitat Conservation Plan for Issuance of an Endangered Species Act Section 10 (a)(1)(B) permit for the incidental take of the Bone Cave harvestman (*Texella reyesi*) during construction and operation of commercial developments on portions of 5.94 acres (Lots 1, 2, 3, 4, and 5) at RR 620 and Great Oaks Drive, Round Rock, Williamson County, Texas (Sultan & Kahn). March 2, 2001.

United States Fish and Wildlife Service (USFWS). 2004. Biological Opinion for the Brushy Creek Municipal Utility District's proposed raw water transmission capacity facilities between Lake Georgetown and the City of Round Rock, Williamson County, Texas (Application No. 200300581). September 09, 2004.

Zara Environmental LLC. 2010. Population status of karst invertebrates in the Balcones Canyonlands Preserve. Prepared for Weston Solutions, Inc. December 29, 2010.

III. Petition literature regarding Inner Space Caverns not directly cited in 90-day finding, but topic addressed in text of 90-day finding [See 80 FR 30994].

Chandler, D.S. 1992. The Pselaphidae (Coleoptera) of Texas caves. Texas Memorial Museum Speleological Monographs 3: 241-254.

Gertsch, W. J. (1992). Distribution patterns and speciation in North American cave spiders with a

list of the troglobites and revision of the *Cicurinas* of the subgenus *Cicurella*. Texas Memorial Museum Speleological Monographs 3: 75-122.

Reddell, J.R., and R. Finch. 1963. The caves of Williamson County. Texas Speleological Survey (2:1).

SWCA Environmental Consultants (SWCA). 2007. A snap-shot Survey of the troglobitic invertebrates of Inner-Space Caverns (Williamson County). P. Paquin. Unpublished data.

IV. Petition literature regarding Sun City caves not directly cited in 90-day finding, but topic addressed in text of 90-day finding [See 80 FR 30994].

Reddell, J. 2000. Biological Studies of Karst Features on Sun City Texas (1995-2000). September 7, 2000.

V. Petition literature cited as examples of species delisted due to recovery. The delisting examples provided comprise instances where reduction in threats to species survival occurred due to a variety of actions ranging from discovery of broader species habitat affinities (including use of human-modified habitats), predator control, translocations, application of enhanced regulatory mechanisms, alteration of recreational land use, to permanent habitat protection. Literature evaluated but not considered directly relevant due to biological dissimilarity of delisted species to Bone Cave harvestman. Listing factors identified as threats contributing to a species initial listing as endangered or threatened are evaluated when delisting is considered, along with any additional threats that have occurred since the time of listing. Threats identified for the Bone Cave harvestman continue to be of an imminent nature and have yet to be significantly eliminated or reduced as in the cited delisting examples.

United States Fish and Wildlife Service (USFWS). 2001. Endangered and Threatened Wildlife and Plants; Final Rule to remove the Aleutian Canada Goose from the Federal List of Endangered and Threatened Plants. March 20, 2001. Federal Register 66(54): 15643-15656.

United States Fish and Wildlife Service (USFWS). 2002. Endangered and Threatened Wildlife and Plants; Removal of *Potentilla robbinsiana* (Robbins' cinquefoil) from the Federal List of Endangered and Threatened Plants. August 27, 2002. Federal Register 67(166): 54968-54975.

United States Fish and Wildlife Service (USFWS). 2003. Endangered and Threatened Wildlife and Plants; Final Rule to Remove the Douglas County Distinct Population Segment of Columbian White-Tailed Deer from the Federal List of Endangered and Threatened Wildlife. July 24, 2003. Federal Register 68(142): 43647-43659.

United States Fish and Wildlife Service (USFWS). 2011. Endangered and Threatened Wildlife and Plants; Removal of the Lake Erie Watersnake (*Nerodia sipedon insularum*) From the Federal List of Endangered and Threatened Wildlife. August 16, 2011. Federal Register 76(158): 50680-50702.

National Oceanic and Atmospheric Administration (NOAA). 2013. Endangered and Threatened Species; Delisting of the Eastern Distinct Population Segment of Stellar Sea Lion under the Endangered Species Act; Amendment to Special Protection Measures for Endangered Marine Mammals. November 4, 2013. Federal Register 78(213): 66140-66199.

VI. Petition literature cited as examples of species delisted due to information regarding species status and/or threats not previously available or evaluated at time of original listing action. The delisting examples provided represent instances where species were found in more locations or more abundant than previously known. In addition, threats had also been reduced or found not to be imminent (e.g., populations were protected due to remote, inaccessible nature of habitat and/or biologically significant populations occur on lands affording enhanced protection). Literature evaluated but not considered directly relevant due to biological dissimilarity of delisted species to Bone Cave harvestman. Listing factors identified as threats contributing to a species' initial listing as endangered or threatened are evaluated when delisting is considered, along with any additional threats that have occurred since the time of listing. Threats identified for the Bone Cave harvestman continue to be of an imminent nature and have yet to be significantly eliminated or reduced as in the cited delisting examples.

United States Fish and Wildlife Service (USFWS). 1983. Endangered and Threatened Wildlife and Plants; Final Rule to Remove the Florida population of the Pine Barrens Treefrog from the List of Endangered and Threatened Wildlife and to rescind previously determined critical habitat. November 22, 1983. Federal Register 48(226): 52740-52743.

United States Fish and Wildlife Service (USFWS). 1989. Endangered and Threatened Wildlife and Plants; Delisting of *Astragalus Perianus* (Rydberg Milk-Vetch). September 14, 1989. Federal Register 54(177): 37941-37943.

United States Fish and Wildlife Service (USFWS). 1993. Endangered and Threatened Wildlife and Plants; Final Rule to Delist the Plant *Hedeoma apiculatum* (McKittrick Pennyroyal) and Remove its Critical Habitat designation. September 22, 1993. Federal Register 58(182): 49244-49247.

United States Fish and Wildlife Service (USFWS). 2010. Endangered and Threatened Wildlife and Plants; Removal of the Utah (Desert) Valvata snail from the Federal List of Endangered and Threatened Wildlife. August 25, 2010. Federal Register 75(164): 52272-52282.

VII. Petition literature regarding the karst fauna region concept. Literature denotes occurrence of listed karst invertebrate species across karst fauna region boundaries with implications for the concept. Karst geologic areas were initially established for portions of Travis and Williamson Counties, Texas in 1992 (Veni 1992) and incorporated as karst fauna regions into the Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, Texas in 1994 (USFWS 1994). Associated karst species zones for the area were subsequently revised in 2007 (Veni and Martinez 2007). Karst fauna regions represent a useful conservation strategy, as these regions can be used to ensure adequate representation and redundancy throughout a species' range. While some studies suggest specific karst fauna regions could be redefined, they remain an overall suitable conservation strategy to aid in species recovery.

Veni & Associates. 1992. Geologic controls on cave development and the distribution of cave fauna in the Austin, Texas, region. Revised February 1992. USFWS Austin, Texas. 77 pp.

White, K. 2006. Paleohydrology of the Edwards Aquifer karst and the evolution of rare and endangered *Cicurina* cave spiders, south-central Texas. University of Mississippi Dissertation. Oxford, Mississippi. Chapter 4: Management and Recovery Implications of the First Molecular Taxonomy Study of Rare and Endangered Cave Adapted Invertebrates in Bexar County, Texas.

White, K. 2009. Minority Report on the Draft Bexar County Karst Invertebrates Recovery Plan highlighting relevant aspects of Part 212 of the Fish and Wildlife Service Manual and the Data Quality Act. Letter to Benjamin N. Tuggle, Regional Director, U.S. Fish and Wildlife Service. May 13, 2009.

White, K., Carothers, S.W., and Berkhouse, C. 2001. The Karst Fauna Region concept and implications for endangered karst invertebrate recovery in Bexar County, Texas. Pp. 148–153 in Proceedings of the 2001 National Cave and Karst Management Symposium, Tucson Arizona.

White, K., Davidson, R.D., and Paquin, P. 2009. Hydrologic evolution of the Edwards Aquifer recharge zone (Balcones fault zone) as recorded in the DNA of eyeless *Cicurina* cave spiders, south-central Texas. *Geology* 37(4):339–342.

VIII. Scientifically relevant literature regarding *Texella* biology, distribution, and/or taxonomy. Literature not directly cited in 90-day finding but previously evaluated and incorporated into earlier Bone Cave harvestman 90-day finding, five-year review, recovery plan, or the final rule.

Cokendolpher, J.C., and J.R. Reddell ed. 2004. Studies on the Cave and Endogean Fauna of North America. IV. Texas Memorial Museum Speleological Monographs Number 6. University of Texas at Austin. Austin, Texas.

Elliott, W.R., and J.R. Reddell. 1989. The status and range of five endangered arthropods from caves in the Austin, Texas, Region. A report on a study supported by the Texas Parks and Wildlife Department and the Texas Nature Conservancy for the Austin Regional Habitat Conservation Plan.

Goodnight, C.J. and M.L. Goodnight. 1967. Opiliones from Texas caves (Opiliones, Phalangodidae). *American Museum Novitates* No. 2301. 8 pp.

Reddell, J.R., and W.R. Elliott. 1991. Distribution of endangered karst invertebrates in the Georgetown Area, Williamson County, Texas. A report on a study for the City of Georgetown. 64 pp.

Ubick, D and Briggs, T.S. 1992. The harvestman family Phalangodidae. 3. Revision of *Texella* Goodnight and Goodnight (Opiliones: Laniatores). *Texas Memorial Museum, Speleological Monographs*, 3:155-240.

Ubick, D and Briggs, T.S. 2004. The harvestman family Phalangodidae. 5. New records and species of *Texella* Goodnight and Goodnight (Opiliones: Laniatores). *Texas Memorial Museum, Speleological Monographs*, 6:101-141.

IX. Petition literature that was evaluated and noted not to contain new, substantive information

Austin Water Utility. (2013). Austin Water: Water Quality Protection Land. Accessed 02/20/14 from <http://www.austintexas.gov/departments/water-quality-protection-land>.

Boersma, P.D., P. Kareiva, W.F. Fagan, J.A. Clark, and J.M. Hoekstra. 2001. How good are endangered species recovery plans? *BioScience* 51:643–649.

Clark, J.A., and E. Harvey. 2002. Assessing Multi-Species Recovery Plans under the Endangered

- Species Act. *Ecological Applications*. Vol. 12, No. 3. June, 2002. Pp. 655-662.
- Drees, B.M. 2002. Managing red imported fire ants in wildlife areas. Texas Agricultural Extension USFWS, Fire Ant Plan Fact Sheet #006.
- Goble, D. 2010. "Recovery." *Endangered Species Act: Law, Policy, and Perspectives*. Ed. Baur, Donald C., and W. Irving. Chicago, IL: American Bar Association, Section of Environment, Energy, and Resources, 2010. Print. [30991]
- MacKenzie, T. 2005. USFWS Southeast Region: Two Kentucky Cave Beetles Not Listed Due to Conservation Efforts—For Immediate Release. December 08, 2005. Accessed 02/20/14. <http://www.fws.gov/southeast/news/2005/r05-132.html>
- NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>. (Accessed: March 13, 2014).
- Nepstad, J., and J. Pisarowicz. 1989. Wind Cave, South Dakota: Temperature and Humidity Variations. *National Speleological Society Bulletin*. 51(2): 125-128). December 1989.
- National Oceanic and Atmospheric Administration (NOAA). 2003. Policy for Evaluation of Conservation Efforts when Making Listing Decisions. March 28, 2003. *Federal Register* 68(60): 15100-15115
- Oster, J., Montanez, J., and N. Kelley. 2012. Response of a modern cave system to large seasonal precipitation variability. *Geochimica et Cosmochimica Acta*. Vol. 91: 92-108. August 2012.
- Parham, G., and C. Scott. 2006. U.S. Fish and Wildlife USFWS Finds Cerulean Warbler Not Warranted for Endangered Species Act Listing. U.S. Fish and Wildlife USFWS Ecological USFWS News Release. December 6, 2006. Accessed 1/27/14 from: <http://www.fws.gov/midwest/es/soc/birds/cerw/cerw12mnthfindnr.html>.
- Pope, S. 2009. The City of Austin Water Quality Protection: Void and Water Flow Mitigation: Rule implementation in Austin, Texas. Presented to the Austin Contractors and Engineers Association Symposium. April 22, 2009.
- Scott, J.M., Goble, D.D., and F.W. Davis. 2006. Introduction. *The Endangered Species Act at Thirty*. Ed. Scott, J.M., Goble, D.D., and F.W. Davis. Pp. 3-15. Print.
- Southern Conservation Corporation. 2005. Candidate Conservation Agreement with Assurances for the Greater Adams Cave Beetle and the Lesser Adams Cave Beetle at Adams Cave, Madison County, Kentucky. Agreement No. TE-088168-0. January 2005.
- SWCA Environmental Consultants (SWCA). 2002. Environmental Assessment/Habitat Conservation Plan For Issuance of an Endangered Species Act Section 10(a)(1)(B) Permit for the Incidental Take of the Golden-cheeked Warbler (*Dendroica chrysoparia*) During the Construction and Operation of a Residential Development on Portions of the

Approximately 78-acre Greenshores Subdivision (Russell Eppright Custom Homes) Travis County, Texas. July 10, 2003.

SWCA Environmental Consultants (SWCA). 2013. Annual Report 2012 Management and Maintenance Activities on the Seven La Cantera Cave Preserves, January 2012-December 2012, Incidental Take Permit TE044512-2. Submitted to U.S. Fish and Wildlife USFWS, Austin, Texas. April 2013.

Travis County Natural Resources and the City of Austin BCP—Austin Water Utility (Travis County, et. al). 2005. Balcones Canyonlands Preserve Karst Management 2004 Annual Report (October 1, 2003 - September 30, 2004).

United States Fish and Wildlife Service (USFWS). 1990. Policy and Guidelines for Planning and Coordinating Recovery of Endangered and Threatened Species. U.S. Department of the Interior. May 25, 1990.

United States Fish and Wildlife Service (USFWS). 2000. Endangered and Threatened Wildlife and Plants; Final Rule to List Nine Bexar County, Texas Invertebrate Species as Endangered. Federal Register 65: 81419-81433.

United States Fish and Wildlife Service (USFWS). 2011. United States Fish and Wildlife Service, Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence surveys for Endangered Karst Invertebrates in Central Texas. U.S. Fish and Wildlife Service, Austin Ecological Services Field Office. Revised September 8, 2011. Access 03/17/14 from:
https://www.fws.gov/southwest/es/Documents/R2ES/Karst_Survey_Protocols_20110908.pdf

United States Fish and Wildlife Service (USFWS). 2012. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Nine Bexar County, TX, Invertebrates. February 14, 2012. Federal Register 77(30): 8450-8523.

United States Fish and Wildlife Service (USFWS). 2013. Environmental Conservation Online System: Delisting Report. Accessed 01/27/14 from:
http://ecos.fws.gov/tess_public/pub/delistingReport.jsp

Williamson County Commissioner's Court. 1993. Petition to delist six invertebrate species found in Williamson and Travis counties, Texas. Submitted June 07, 1993.

Defense Exhibit 2

From: [Smith-Castro, Jennifer](#)
To: [Susan Jacobsen](#); seth_willey@fws.gov; [Brady McGee](#)
Subject: DCN FR2856 (Bone Cave Harvestman)
Date: Friday, February 24, 2017 11:30:11 AM

Hi All -

One other item to note regarding this package is the petition regulations revisions. The petition was originally received June 2, 2014. The supplemental information was received by us on October 6, 2016. The new petition regulations did not go into effect until October 27, 2016. Thus we decided to use the petition regulations that were in effect at the time the original petition was received. This has not changed. However, Debby provided the following feedback about the petition regulations and standard of review issue:

- with reference to the BCH FR notice, Pg 3: Substantial Information Standard:
- it turns out that the regs revision (FR 81 66462) added “credible” see comment response 54, page 66473 and 66479

" . . . clarifies the substantial-information standard for 90-day findings by defining it as credible scientific and commercial information that would lead a reasonable person conducting an impartial scientific review to conclude that the action proposed in the petition may be warranted. Thus it makes clear that conclusory statements made in a petition without the support of credible scientific or commercial information are not “substantial information.” For example, a petition that states only that a species is rare, and thus should be listed, without other credible information regarding its status and threats, likely does not provide substantial information. '

This has prompted us to change the language in the draft 90-day finding from "Our standard for substantial scientific or commercial information with regard to a 90-day petition finding is “that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted” (50 CFR 424.14(b)(1)). to ""Our standard for substantial scientific or commercial information with regard to a 90-day petition finding was “that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted” (50 CFR 424.14(b)(1)).

I was asked to clarify that the new standard makes only changes that: 1) are more stringent for petitioners in this instance and 2) would not ultimately affect the conclusion reached.

Thanks!

Jennifer

--

Jennifer Smith-Castro
Recovery Biologist
U.S. Fish & Wildlife Service
17629 El Camino Real #211

Houston, Texas, 77058

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Fax 281-488-5882

jennifer_smith-castro@fws.gov

Sharepoint site: <https://fishnet.fws.doi.net/regions/2/eco/recovery/SitePages/Home.aspx>

Defense Exhibit 3

From: [McGee, Brady](#)
To: [Susan Jacobsen](#)
Subject: Re: Bone Cave Harvestman 90-day
Date: Wednesday, March 15, 2017 1:14:54 PM

The RD approved this package on 2/23....formal package has been in HQ ever since along with RSOL surname.

Thanks,

Brady

Brady McGee, Ph.D.
Branch Chief, Recovery and Restoration
U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103
505-248-6657; cell 505-908-8491

On Wed, Mar 15, 2017 at 10:33 AM, Susan Jacobsen <susan_jacobsen@fws.gov> wrote:
Not sure where this stands

Sent from my iPhone

Begin forwarded message:

From: Adam Zerrenner <adam_zerrenner@fws.gov>
Date: March 13, 2017 at 6:12:55 PM CDT
To: "Koch, Ted" <ted_koch@fws.gov>
Cc: Susan Jacobsen <susan_jacobsen@fws.gov>, Shawn Sartorius <shawn_sartorius@fws.gov>
Subject: Re: Bone Cave Harvestman 90-day

Hi Ted,

I'm available tomorrow and Wednesday as well to talk. Is there a time that works best for all or would you prefer I just give you a call?

Thanks,

Adam

Sent from my iPhone

On Mar 13, 2017, at 5:21 PM, Koch, Ted <ted_koch@fws.gov>

wrote:

Adam et al.-

Benjamin was asking critical questions about our proposed negative 90-day finding for bone cave harvestman delisting petition. He correctly pointed out that making a positive 90-day is a pretty "low bar," and that this species is somewhat controversial.

Can we get on the phone to discuss? I'm on my cell tomorrow, and at my desk again Wednesday.

Thanks,

Ted

--

Ted Koch

Assistant Regional Director, Ecological Services

U.S. Fish and Wildlife Service, Region 2

P.O. Box 1306

Albuquerque, NM 87103-1306

505-248-6644

Defense Exhibit 4

From: [Adam Zerrenner](#)
To: michael_warriner@fws.gov
Cc: [Jennifer Castro Smith](#); brady_mcgee@fws.gov; susan_jacobsen@fws.gov; shawn_sartorius@fws.gov
Subject: Fwd: Bone Cave 90-day justification
Date: Wednesday, March 15, 2017 7:19:28 PM

Hi Michael,

Would you please take the lead working with Jenny on this request.

Please provide briefing materials and bullet list to Ted and others in RO.

Please have this info to them by noon tomorrow.

Appreciate it,

Adam

Sent from my iPhone

Begin forwarded message:

From: Adam Zerrenner <adam_zerrenner@fws.gov>
Date: March 15, 2017 at 5:27:06 PM CDT
To: "Koch, Ted" <ted_koch@fws.gov>
Cc: Susan Jacobsen <susan_jacobsen@fws.gov>, Shawn Sartorius <shawn_sartorius@fws.gov>, michael_warriner@fws.gov, Jennifer Castro Smith <jennifer_smith-castro@fws.gov>, brady_mcgee@fws.gov
Subject: Re: Bone Cave 90-day justification

Hi Ted,

I believe this one is in Brady's brach, so I'm ccing Brady and others so they can provide.

Thanks,

Adam

Sent from my iPhone

On Mar 15, 2017, at 5:20 PM, Koch, Ted <ted_koch@fws.gov> wrote:

Howdy-

Would someone please share with me our brief and whatever other information we generated for our bone cave harvestman negative 90-day finding? We need to develop a list of bullets explaining why we got to this decision so we can answer when asked. Soon.

Thanks,

Ted

--

Ted Koch

Assistant Regional Director, Ecological Services

U.S. Fish and Wildlife Service, Region 2

P.O. Box 1306

Albuquerque, NM 87103-1306

505-248-6644

Defense Exhibit 5

From: [McGee, Brady](#)
To: [Adam Zerrenner](#)
Cc: [Koch, Ted](#); [Susan Jacobsen](#); [Shawn Sartorius](#); [Michael Warriner](#); [Jennifer Castro Smith](#)
Subject: Re: Bone Cave 90-day justification
Date: Thursday, March 16, 2017 8:56:38 AM
Attachments: [Bullet Points for RD.docx](#)

Hi Ted,

Attached are bullet points for RD.

Thanks,

Brady

Brady McGee, Ph.D.
Branch Chief, Recovery and Restoration
U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103
505-248-6657; cell 505-908-8491

On Wed, Mar 15, 2017 at 4:27 PM, Adam Zerrenner <adam_zerrenner@fws.gov> wrote:

Hi Ted,

I believe this one is in Brady's brach, so I'm ccing Brady and others so they can provide.

Thanks,

Adam

Sent from my iPhone

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> Would someone please share with me our brief and whatever other information we generated for our bone cave harvestman negative 90-day finding? We need to develop a list of bullets explaining why we got to this decision so we can answer when asked. Soon.

>

> Thanks,

>

> Ted

>

>

> --

> Ted Koch
> Assistant Regional Director, Ecological Services
> U.S. Fish and Wildlife Service, Region 2
> P.O. Box 1306
> Albuquerque, NM 87103-1306
> 505-248-6644
>

Defense Exhibit 6

Bullets for RD on Bone Cave Harvestman Second 90-day Finding:

- On December 4, 2009, we completed a 5-year review of the Bone Cave harvestman, which recommended that the species remain listed as endangered.
- On June 2, 2014, we received a petition from John Yearwood, Kathryn Heidemann, Charles and Cheryl Shell, the Walter Sidney Shell Management Trust, the American Stewards of Liberty, and Steven W. Carothers requesting that we remove the endangered Bone Cave harvestman from the Federal lists of endangered and threatened species.
- On October 6, 2016, we received supplemental information.
- We therefore evaluated this petition under the 50 CFR 424.14 requirements that were in effect prior to October 27, 2016, as those requirements applied when the petition and supplemental information were received.
- At that time, our standard for substantial scientific or commercial information within the Code of Federal Regulations (CFR) with regard to a 90-day petition finding was “that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted” (50 CFR 424.14(b)(1)).
- On June 1, 2015, the Service published a 90-day finding in the **Federal Register** that the petition did not present substantial scientific or commercial information indicating that the petitioned action was warranted.
 - All the substantial information presented in the petition or supplemental information was already considered in the 2009 5-year review.
- On December 15, 2015, the American Stewards of Liberty, Charles and Cheryl Shell, Walter Sidney Shell Management Trust, Kathryn Heidemann, and Robert V. Harrison, Sr. challenged the 2015 90-day finding in Federal district court.
- The Service sought the court’s permission to reconsider the 90-day finding after concluding that certain materials accompanying the petition were inadvertently not considered in the 2015 90-day finding.
 - The petitioners submitted a cd that was lost and no one knew anything about it.
- On December 22, 2016, the court ordered the Service to complete a 90-day finding and deliver that finding to the **Federal Register** on or before **March 31, 2017**. This finding addresses the court’s order and the 2014 petition.
 - On February 23, 2017, the formal package with RSOL surname and RD approval was sent to HQ.
- Based on our review, we find that the petition does not present substantial scientific or commercial information indicating that the petitioned action may be warranted.
 - There was no new substantial information on the cd.
- Although this finding ends our formal consideration of the petition, we are in the process of conducting a species status assessment and 5-year status review. The 5-year review will consider whether the species status has changed since the time of its listing or its last status review and whether it should be reclassified as threatened or delisted.

Defense Exhibit 7

From: [Warriner, Michael](#)
To: [McGee, Brady](#)
Subject: Re: Bone Cave 90-day justification
Date: Thursday, March 16, 2017 9:01:08 AM

10-4.

On Thu, Mar 16, 2017 at 10:00 AM, McGee, Brady <brady_mcgee@fws.gov> wrote:
Hi Michael,

I don't think so. Thanks anyway!

Brady

Brady McGee, Ph.D.
Branch Chief, Recovery and Restoration
U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103
505-248-6657; cell 505-908-8491

On Thu, Mar 16, 2017 at 8:59 AM, Warriner, Michael <michael_warriner@fws.gov> wrote:
Hey Brady,

I have a document I was working up. Do you think I should shoot that to you and Ted as well?

On Thu, Mar 16, 2017 at 9:56 AM, McGee, Brady <brady_mcgee@fws.gov> wrote:
Hi Ted,

Attached are bullet points for RD.

Thanks,

Brady

Brady McGee, Ph.D.
Branch Chief, Recovery and Restoration
U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103
505-248-6657; cell 505-908-8491

On Wed, Mar 15, 2017 at 4:27 PM, Adam Zerrenner <adam_zerrenner@fws.gov>

wrote:

Hi Ted,

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Thanks,

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Sent from my iPhone

> On Mar 15, 2017, at 5:20 PM, Koch, Ted <ted_koch@fws.gov> wrote:

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>

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>

> Ted

>

>

> --

> Ted Koch

> Assistant Regional Director, Ecological Services

> U.S. Fish and Wildlife Service, Region 2

> P.O. Box 1306

> Albuquerque, NM 87103-1306

> 505-248-6644

>

--

Michael D. Warriner
Supervisory Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758
Office: 512.490.0057 ext. 236
Cell: 512.850.9180
Fax: 512.490.0974
michael_warriner@fws.gov

--

Michael D. Warriner
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U.S. Fish and Wildlife Service
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758
Office: 512.490.0057 ext. 236
Cell: 512.850.9180
Fax: 512.490.0974
michael_warriner@fws.gov

Defense Exhibit 8

From: [McGee, Brady](#)
To: [Koch, Ted](#)
Cc: [Adam Zerrenner](#); [Susan Jacobsen](#); [Shawn Sartorius](#); [Michael Warriner](#); [Jennifer Castro Smith](#)
Subject: Re: Bone Cave 90-day justification
Date: Thursday, March 16, 2017 9:28:37 AM
Attachments: [Bullet Points for RD v2.docx](#)

v2 attached

Thanks,

Brady

Brady McGee, Ph.D.
Branch Chief, Recovery and Restoration
U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103
505-248-6657; cell 505-908-8491

On Thu, Mar 16, 2017 at 8:59 AM, Koch, Ted <ted_koch@fws.gov> wrote:

Helpful, thanks. It's confusing to me not being in chronological order, and I think we can pare down some words. Can we work on the chronological order thing, and I can try a little editing?

On Thu, Mar 16, 2017 at 8:56 AM, McGee, Brady <brady_mcgee@fws.gov> wrote:

Hi Ted,

Attached are bullet points for RD.

Thanks,

Brady

Brady McGee, Ph.D.
Branch Chief, Recovery and Restoration
U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103
505-248-6657; cell 505-908-8491

On Wed, Mar 15, 2017 at 4:27 PM, Adam Zerrenner <adam_zerrenner@fws.gov> wrote:

Hi Ted,

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so they can provide.

Thanks,

Adam

Sent from my iPhone

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Soon.

>

> Thanks,

>

> Ted

>

>

> --

> Ted Koch

> Assistant Regional Director, Ecological Services

> U.S. Fish and Wildlife Service, Region 2

> P.O. Box 1306

> Albuquerque, NM 87103-1306

> 505-248-6644

>

--

Ted Koch

Assistant Regional Director, Ecological Services

U.S. Fish and Wildlife Service, Region 2

P.O. Box 1306

Albuquerque, NM 87103-1306

505-248-6644

Defense Exhibit 9

Bullets for RD on Bone Cave Harvestman Second 90-day Finding:

- December 4, 2009, we completed a 5-year review, which recommended the species remain listed as endangered.
- June 2, 2014, we received a delisting petition.
- June 1, 2015, we published a not substantial 90-day finding
- December 15, 2015, the American Stewards of Liberty, Charles and Cheryl Shell, Walter Sidney Shell Management Trust, Kathryn Heidemann, and Robert V. Harrison, Sr. challenged the 2015 90-day finding in Federal district court.
- October 6, 2016, we received supplemental information.
- December 22, 2016, the court ordered us to deliver another 90-day finding to the Federal Register on or before **March 31, 2017**. This finding addresses the court's order and the 2014 petition.
- February 23, 2017, we submitted a not substantial 90-day formal package to HQ
- Currently, the Austin ESFO is in the process of conducting an SSA that will inform a 5-year status review.

Defense Exhibit 10

From: [McGee, Brady](#)
To: [Koch, Ted](#)
Cc: [Seth Willey](#)
Subject: Bullet Points for RD - Bone Cave 90-day
Date: Friday, March 17, 2017 10:20:54 AM
Attachments: [Bullet Points for RD v3.docx](#)

Hi Ted,

v3 attached

Thanks,

Brady

Brady McGee, Ph.D.
Branch Chief, Recovery and Restoration
U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103
505-248-6657; cell 505-908-8491

On Thu, Mar 16, 2017 at 9:28 AM, McGee, Brady <brady_mcgee@fws.gov> wrote:
v2 attached

Thanks,

Brady

Brady McGee, Ph.D.
Branch Chief, Recovery and Restoration
U.S. Fish and Wildlife Service
Southwest Regional Office
P.O. Box 1306
Albuquerque, NM 87103
505-248-6657; cell 505-908-8491

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Helpful, thanks. It's confusing to me not being in chronological order, and I think we can pare down some words. Can we work on the chronological order thing, and I can try a little editing?

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Attached are bullet points for RD.

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505-248-6657; cell 505-908-8491

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Adam

Sent from my iPhone

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> --

> Ted Koch

> Assistant Regional Director, Ecological Services

> U.S. Fish and Wildlife Service, Region 2

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>

--

Ted Koch
Assistant Regional Director, Ecological Services
U.S. Fish and Wildlife Service, Region 2
P.O. Box 1306
Albuquerque, NM 87103-1306
505-248-6644

Defense Exhibit 11

Bullets for RD on Bone Cave Harvestman Second 90-day Finding:

- December 4, 2009, we completed a 5-year review, which recommended the species remain listed as endangered.
- June 2, 2014, we received a delisting petition.
- June 1, 2015, we published a not substantial 90-day finding
 - All the substantial information presented in the petition or supplemental information was already considered in the 2009 5-year review.
- December 15, 2015, the American Stewards of Liberty, Charles and Cheryl Shell, Walter Sidney Shell Management Trust, Kathryn Heidemann, and Robert V. Harrison, Sr. challenged the 2015 90-day finding in Federal district court.
- October 6, 2016, we received supplemental information, including materials accompanying the petition that were inadvertently not considered in the 2015 90-day finding.
- December 22, 2016, the court ordered us to deliver another 90-day finding to the Federal Register on or before **March 31, 2017**. This finding addresses the court's order and the 2014 petition.
- February 23, 2017, we submitted a not substantial 90-day formal package to HQ
 - Again, all the substantial information presented in the petition or supplemental information was already considered in the 2009 5-year review.
- Currently, the Austin ESFO is in the process of conducting a 5-year status review, which evaluates the species' status similar to what would have occurred with a positive 90-day finding.

Defense Exhibit 12

Briefing: 90-day Finding to Delist the Bone Cave Harvestman



M003043

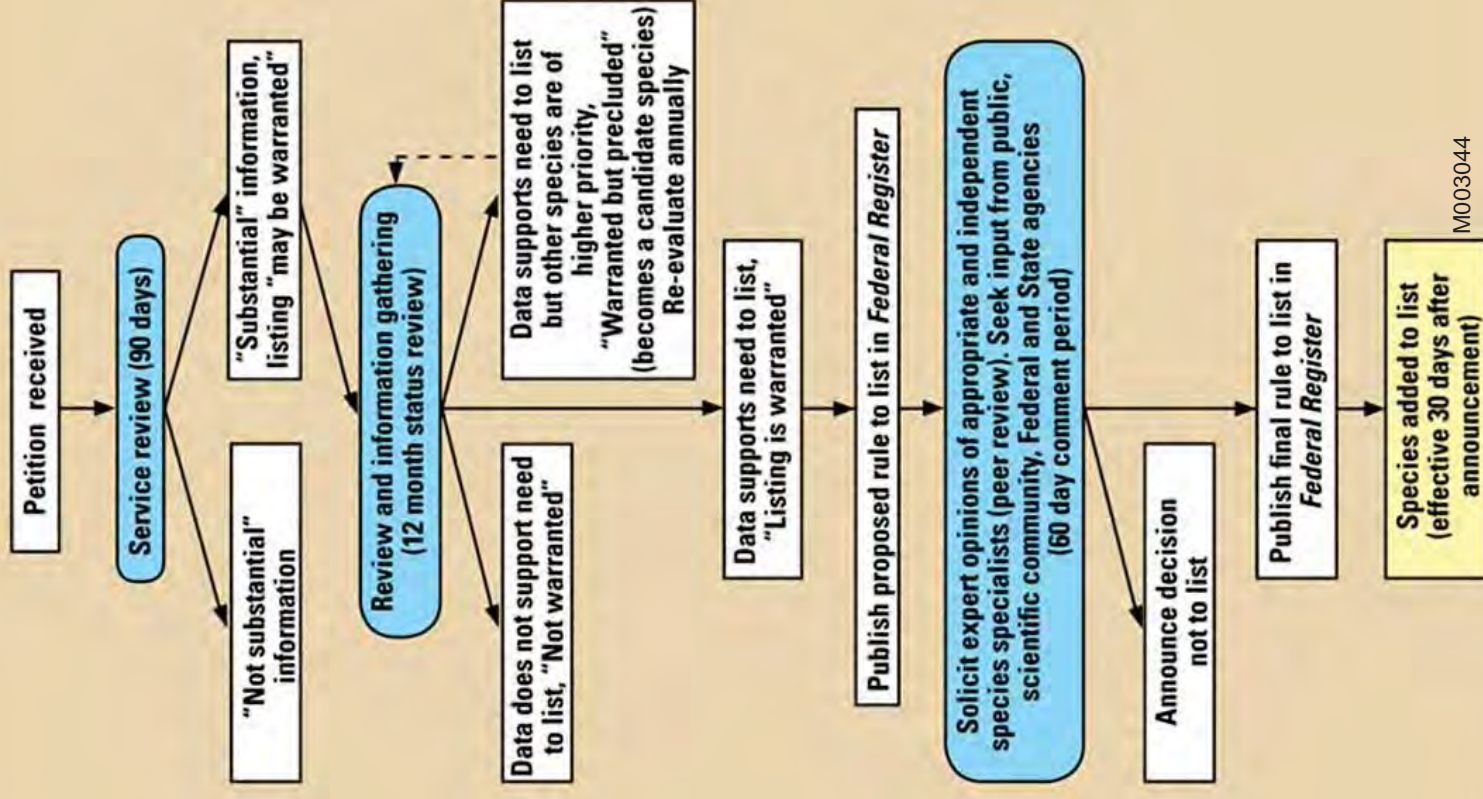
Endangered Specie Act

Petition Process – Section 4(b)(3)

- Section 4(b)(3) of ESA allows public participation in Service’s listing /delisting/ reclassification process
- List, delist, or reclassify species (Sec 4(b)(3)(A))
- Revise critical habitat (Sec 4(b)(3)(D))
- Defined statutory time-frames for processing

90-day Evaluation

- Limit evaluation to information provided by the petitioner (“Four Corners” of the petition)
- Only use information in our files to refute petition claims
- Do not actively search for or solicit outside data at the 90-day stage



Endangered Specie Act

Substantial Information Standard

- That amount of information that would lead a reasonable person to believe the action requested may be warranted.

Threats Analysis: Five Factors

- Present or threatened destruction, modification, or curtailment of habitat or range
- Over-utilization for commercial, recreational, scientific, or educational purposes
- Disease or predation
- Inadequacy of existing regulatory mechanisms
- Other natural or manmade factors affecting its continued existence.

Not Substantial Finding

- Final agency action

Substantial Finding

- Opens a 60 day information solicitation period
- Proceed with Status Review

Petition to Delist the Bone Cave Harvestman (*Texella reyesi*)

Petitioned on June 2, 2014 by:

- John F. Yearwood
- Kathryn Heidemann
- Charles and Cheryl Shell
- Walter Sidney Shell Management Trust
- American Stewards of Liberty
- Steven W. Carothers

Status of the Species

- Increase in known localities from five or six at the time of listing to 172.
- Significant conservation is in place with at least 94 known localities (55% of the total known localities) currently protected in preserves, parks, or other open spaces.
- Regulatory protections are afforded to most caves in Travis and Williamson counties via state laws and regulations and local ordinances.
- Biologists continue to discover new, occupied localities and this trend is likely to continue as more areas are explored and more caves are discovered.

Petition to Delist the Bone Cave Harvestman (*Texella reyesi*)

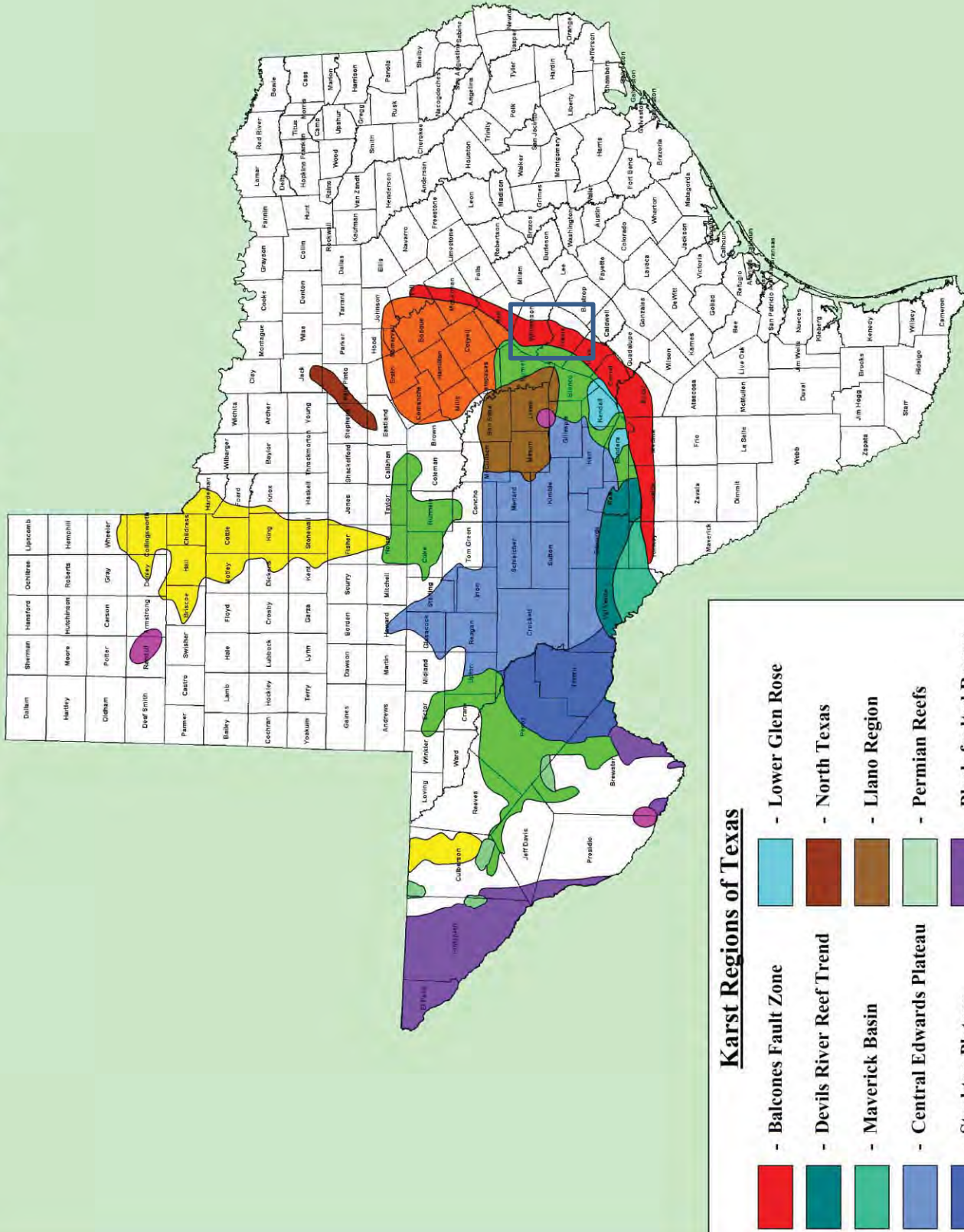
Review of Endangered Species Act Listing Factors:

- Development activities on the surface may not result in the significant loss or degradation of habitat as originally thought. Several examples of continued species persistence in developed areas include: Inner Space Caverns, Sun City caves, Three-Mile Cave, Four-Mile Cave, and Weldon Cave.
- Inner Space Caverns demonstrates that the species can persist in caves with frequent human visitation and may be more tolerant of related habitat modifications than originally believed.
- Recent studies suggest that fire ants may not present as significant or as lasting of a threat to the species as originally believed.
- The regulatory landscape includes a number of measures contributing to the conservation of the species outside of the protections afforded by the Endangered Species Act of 1973, as amended.
- The use of small voids or “mesocaverns” within the geologic formations known to support occupied caves mitigates the potential threat of climate change.

Biology of the Bone Cave Harvestman (*Texella reyesi*)

- Species restricted to subterranean environments (troglomite)
- Exhibits morphological adaptations to that environment (elongated appendages and loss of eyes and pigment)
- Habitat includes caves and mesocavernous voids in karst limestone
- Restricted to Travis and Williamson Counties, Texas
- Region of Texas with high karst invertebrate endemism and species diversity
- Species depends on high humidity, stable temperatures, and nutrients derived from the surface
- Subterranean ecosystem is very dependent on the condition of overlying surface habitat
- Cave crickets serve important role in nutrient input and exchange in (prey item)
- Harvestman are predaceous upon small or immature arthropods.
- Low metabolic and reproductive rates; difficult to detect

KARST REGIONS of TEXAS



Karst Regions of Texas

- Balcones Fault Zone
- Devils River Reef Trend
- Maverick Basin
- Central Edwards Plateau
- Stockton Plateau
- Lampasas Cut Plain
- Isolated Edwards Group Outliers
- Lower Glen Rose
- North Texas
- Llano Region
- Permian Reefs
- Block-faulted Ranges
- Permian Gypsum Karst
- Isolated Pseudokarst

Modified from: Elliott and Vent (1994)

M003049

Bone Cave Harvestman (*Texella reyesi*) Listing Status

Listed as endangered in 1988 based on the threats of:

- Habitat loss to development
- Cave collapse or filling
- Alteration of drainage patterns
- Alteration of surface plant and animal communities, changes in competition for limited resources and resulting nutrient depletion, and the loss of native vegetative cover leading to changes in surface microclimates and erosion
- Contamination, including groundwater, from nearby agricultural disturbance, pesticides, and fertilizers
- Leakages and spills of hazardous materials from vehicles, tanks, pipelines, and other urban or industrial runoff
- Human visitation, vandalism, and dumping; mining; quarrying (limestone); or, blasting above or in caves

Five-year Review

- Completed in 2009
- Recommended that species remain listed as endangered

Recovery Criteria

Downlisting:

- Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, Texas
- Only addresses reclassification from endangered to threatened
- Uncertain about prospects for recovery and delisting
- Three karst fauna areas within each karst fauna region in each species' range should be protected in perpetuity. If fewer than three karst fauna areas exist within a given karst fauna region of a given species' range, then all karst fauna areas within that region should be protected.
- Karst fauna areas should be maintained for at least five consecutive years with assurances that these areas will remain protected in perpetuity before downlisting.

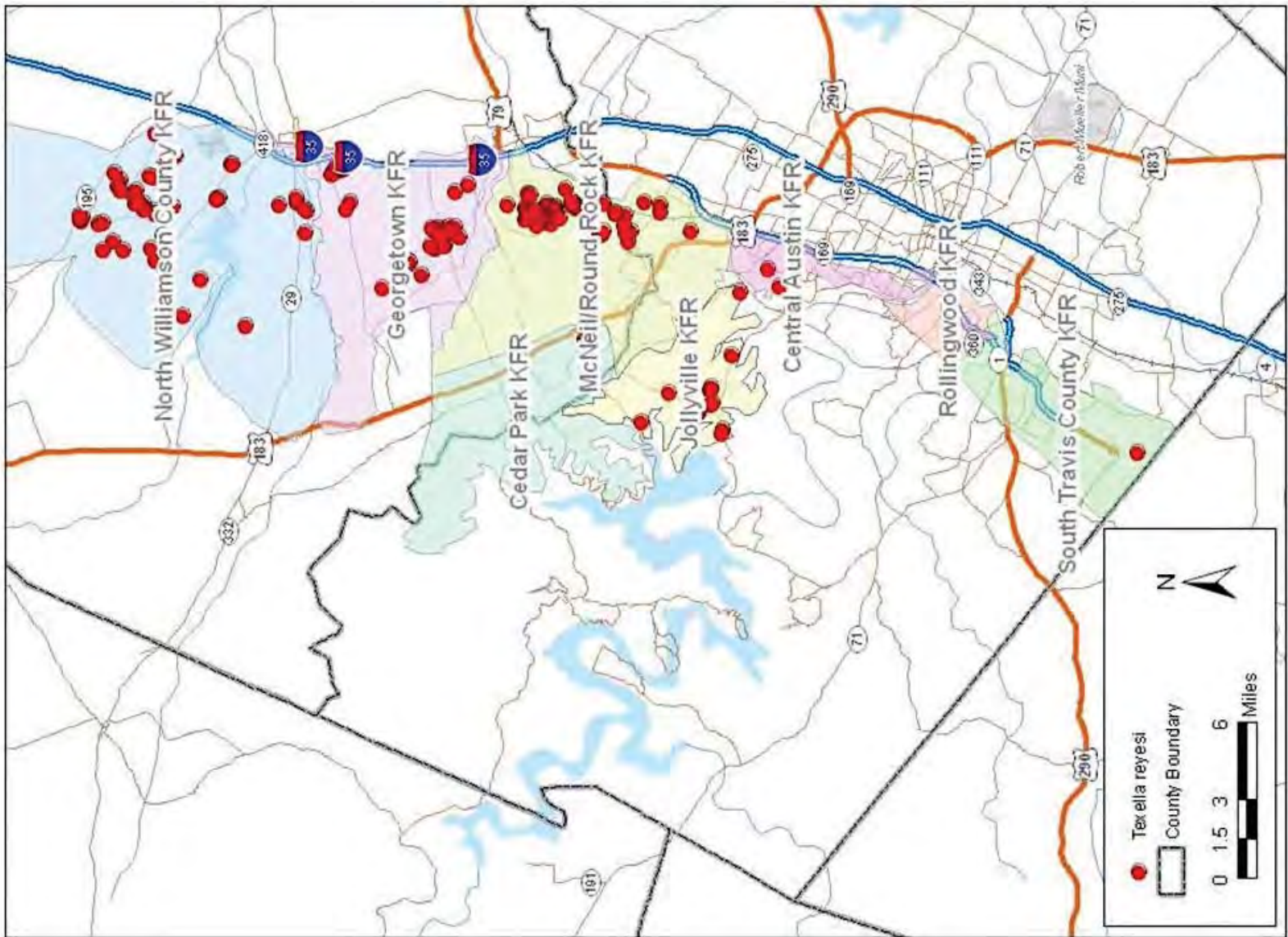
Recovery Criteria

Karst Fauna Region

- Geographic areas delineated based on geologic continuity, hydrology, and the distribution of rare karst invertebrates.
- Six Karst fauna regions in Travis and Williamson Counties

Karst Fauna Area

- Geographic area known to support one or more locations of an endangered species.
- A karst fauna is distinct in that it acts as a system that is separated from other karst fauna areas by geologic and hydrologic features and/or processes or distances that create barriers to movement of water, contaminants, and troglobitic fauna.
- Karst fauna areas should be far enough apart that a catastrophic event (such as contaminants from a spill, pipeline leak, or flooding, etc.) that may kill species or destroy habitat in one area would be unlikely to impact species or habitat in other areas.



M003053

Recovery Criteria

Delisting:

- Bexar County Karst Invertebrates Recovery Plan
- Delisting should be considered when threats have been removed or reduced as indicated by the following:
 - The location and configuration of a least the minimum quality and number of karst fauna areas in each karst fauna region or each species are preserved.
 - Legally binding commitments are in place for perpetual protection and management of these karst fauna areas.
 - In addition to the downlisting criterion, monitoring and research have been completed to conclude with a high degree of certainty that KFA sizes, quality, configurations, and management are adequate to provide a high probability of the species survival (greater than 90 percent over 100 years).

Recovery Criteria

Karst Fauna Preserve Design Guidelines:

- Surface and subsurface drainage basins of at least one occupied cave or karst feature is located entirely within the preserve.
- A minimum of 40 to 100 acres of contiguous, unfragmented, undisturbed land to maintain native plant and animal communities around the feature and protect the subsurface karst community.
- 345-foot radius undisturbed area from each cave footprint for cave cricket foraging.
- Preserves should be free of pipelines, storage tanks, or other facilities that could cause contamination.
- Guidelines developed through Bexar County Karst Invertebrate Recovery Team, peer review comments, and latest scientific information.

Preserve Quality:

High quality preserve is at least 100 acres and includes the following components:

- the entire surface and subsurface drainage basin of caves and karst features
- the native surface plant and animal communities
- the cave or karst feature footprint, which should be over 345 feet from the preserve edge

Medium quality preserve is 40 to 99 acres with same components as above.

Low quality preserve is less than 40 acres and does not meet recovery criteria. May serve to increase probability of overall species survival beyond what it would be without them.

Review of Petition and Threat Factors

Species Distribution and Protective Status of Populations:

- The petition states there are now more known occupied locations identified for this species with 94 karst preserve areas currently providing significant conservation.

90-day Finding

- There are more known locations since the time the five-year review was completed
- Increase is likely an increase in our knowledge, not a true increase in the number of populations or range; however, species are listed under the Act based on threats and not just the number of sites or size of the range.
- Status of all known locations assessed in five-year review, 21 areas appeared to have ability to meet preserve design criteria.
- Information lacking whether those 21 areas have adequate undeveloped acreage, management, or protection mechanisms to ensure the long-term protection and survival of species
- Amount of protected karst fauna area still falls short of the criteria for reclassification from endangered to threatened.
- Five protected karst fauna areas currently meet preserve design criteria.
- Four protected areas occur in the North Williamson County Karst Fauna Region and one in the Jollyville Plateau Karst Fauna Region.
- Best available information indicates criteria for reclassification have not been met.

Review of Petition and Threat Factors

Factor A: The present or threatened destruction, modification, or curtailment of the species' habitat or range:

- The petition states that development activities on the surface may not result in the significant loss or degradation of species habitat as originally thought and suggests that evidence of this is the species persistence in caves surrounded by developed areas.

90-day Finding

- Species characterized by low metabolic and reproductive rates, long life spans, and low sample sizes, which make it difficult to detect population response to possible impacts.
- Populations may be declining or threatened even though they are still observed at a specific site. Information adequate to detect population trends for this species is not readily available and was not provided in the petition.
- Studies from central Texas caves indicate that urbanization can reduce karst invertebrate populations through reduced nutrient input.
- Travis and Williamson Counties among fastest growing counties in the United States.
 - Travis County population projection: 1,024,266 in 2010 to 1,990,820 in 2050
 - Williamson County population projection: 422,679 in 2010 to 2,015,294 in 2050

Review of Petition and Threat Factors

Factor A: The present or threatened destruction, modification, or curtailment of the species' habitat or range:

- The petition provides examples of caves where the species can persist in developed areas.

90-day Finding

- The petition did not provide data adequate to assess trends in the karst invertebrate populations since the development occurred.
- Although the species may be present in these caves, this does not ensure their populations are robust and secure
- Populations may still be declining, and are at risk due to competition with surface-dwelling invertebrates and other threats associated with development such as the potential for contamination.

Review of Petition and Threat Factors

Factor A: The present or threatened destruction, modification, or curtailment of the species' habitat or range

- The petition states that since the species uses mesocaverns, it is protected from surface development activities because mesocaverns are “geologically protected.”

90-day Finding

- Mesocaverns are subject to rapid permeation of surface water, and karst landscapes are particularly susceptible to groundwater contamination because water penetrates rapidly through bedrock conduits providing little or no filtration.

Review of Petition and Threat Factors

Factor B: Overutilization for commercial, recreational, scientific, or educational purposes

- The petition and our review of the information in our files did not identify any threats under this factor.

90-day Finding

- The 1988 listing rule did not identify any threats under this factor.

Review of Petition and Threat Factors

Factor C: Disease or predation

- The petition states that “Recent studies suggest that fire ants may not present as significant or as lasting of a threat to the species as originally believed.” Petitioners reference Morrison (2002) that found that arthropod communities had rebounded to pre-red imported fire ant-invasion levels in their study area.

90-day Finding

- Morrison (2002) also states that “it is quite likely that red imported fire ants did contribute directly or indirectly to the disappearance or reduction in numbers of species” and that their study “should not be interpreted as an indication that detrimental effects of invasive ants will simply disappear with time.”
- Red-imported fire ants have been found within and near many caves in central Texas and have been observed feeding on dead troglobites, cave crickets, and other species within caves.

Review of Petition and Threat Factors

Factor D: The inadequacy of existing regulatory mechanisms

- The petition states that “the regulatory landscape includes a number of measures contributing to the conservation of the species outside of the protections afforded by the Endangered Species Act of 1973. Examples provide are from City of Austin, City of Georgetown, and Texas Commission on Environmental Quality.

90-day Finding

- The City of Austin’s Environmental Criteria Manual provides a 150- to 300-ft set-back area around caves. Those distances are not adequate to meet our preserve design criteria, do not protect the cave cricket foraging area, and potentially do not include the surface and subsurface drainage basins.
- The City of Georgetown Water Quality Management Plan provides protection for sites occupied by the Georgetown salamander. No Bone Cave harvestman occur in close enough proximity to salamander sites to benefit.
- Texas Commission on Environmental Quality practices provide protection from water quality impacts, others, such as sealing cave entrances for water quality reasons, can harm karst invertebrates. In addition, not all of the caves that the species occurs in are considered recharge features and, therefore, would not receive some of the water quality protection measures.

Review of Petition and Threat Factors

Factor E: Other natural or manmade factors affecting the continued existence of the species.

- The petition states, “Inner Space Cavern demonstrates that the species can persist in caves with frequent human visitation and may be more tolerant of related habitat modification than originally believed.” They also provide other caves as examples of sites that have experienced human use yet the species persists.

90-day Finding

- No detailed information was provided to demonstrate if these caves experienced continued human use. In addition, the petition provided no trend analysis for these caves.
- Observation of the species in these locations does not mean the populations at these locations have not been impacted or can withstand the long-term impacts of development or human visitation.

Review of Petition and Threat Factors

Factor E: Other natural or manmade factors affecting the continued existence of the species.

- The petitioners state that “the use of small voids or “mesocaverns” within the geologic formations known to support occupied caves mitigates the potential threat of climate change.”

90-day Finding

- The presence of mesocaverns alone will likely not be sufficient to ameliorate all of the effects that climate change may pose to this species.
- Karst invertebrates depend on stable temperatures and high humidity
- If average surface temperatures increase, this could result in increased in-cave temperatures, which could affect the species.
- Drier and less suitable conditions in caves will likely cause the species to retreat farther into mesocaverns and away from nutrients located in larger cave passages.
- Caves in arid regions have been shown to have smaller invertebrate populations and diversity due to less moisture and nutrient availability.

Summary

- The petitioners based their assessment that the species can thrive in developed areas on information previously reviewed by the Service (Five-year review).
- Urbanization and human population growth and development continue to represent a threat to the species.
- No trend analyses were provided to indicate this species can withstand the threats associated with development, urbanization, or climate change over the long-term.
- Although additional populations have been identified since the five-year review, these sites are not adequately protected and do not meet our preserve design criteria.
- We find that the petition does not present substantial scientific or commercial information indicating that delisting of the species is warranted.

Defense Exhibit 13

Briefing: 90-day Finding to Delist the Bone Cave Harvestman



Southwest Region, Austin Ecological Services Field Office

M003088

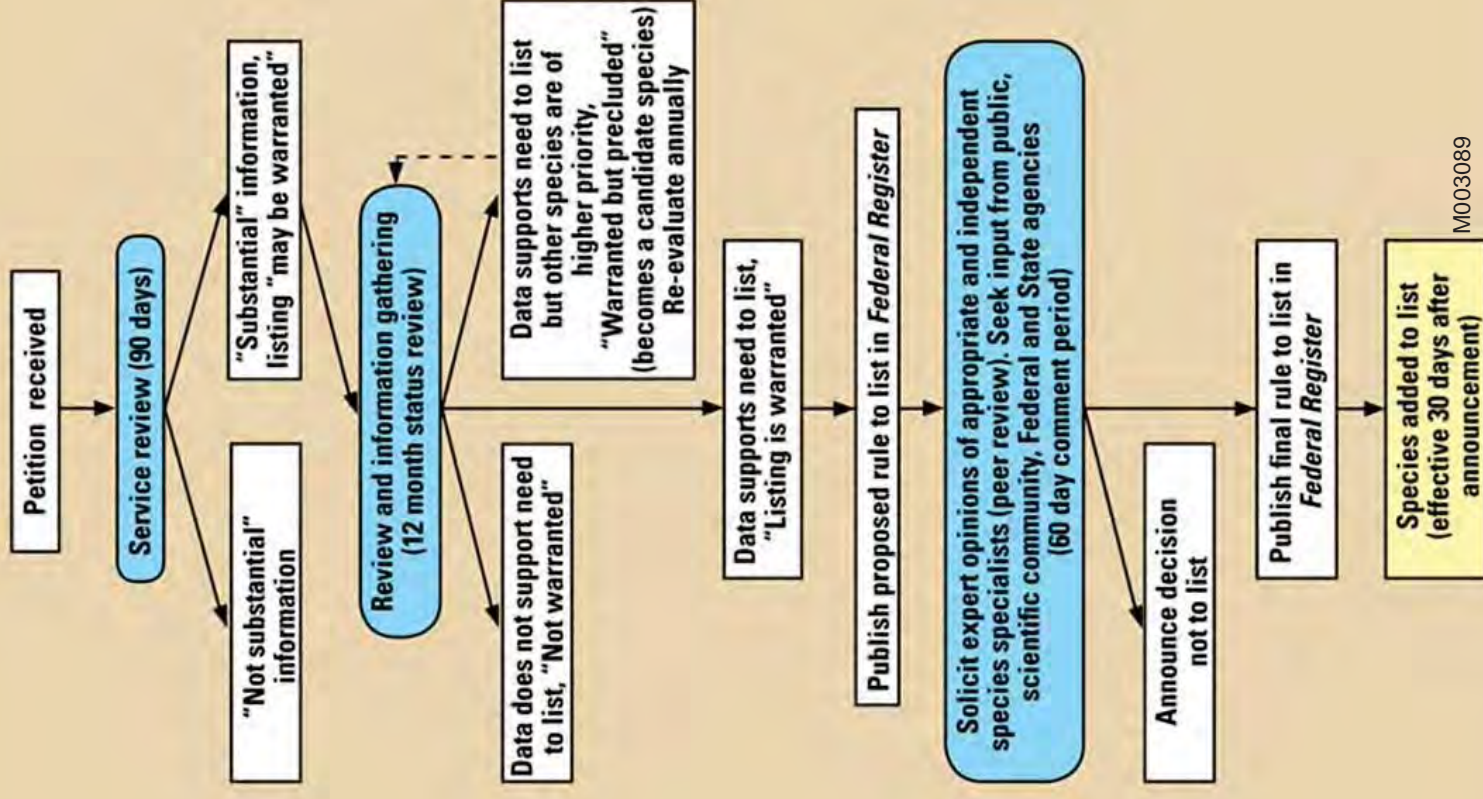
Endangered Species Act

Petition Process – Section 4(b)(3)

- Section 4(b)(3) of ESA allows public participation in listing /delisting/ reclassification process
- Defined statutory time-frames

90-day Evaluation

- Limit evaluation to information provided by the petitioner
- Only use information in our files to refute petition claims
- Do not actively search for or solicit outside data at the 90-day stage



Evaluation of 90-day Finding

Substantial Information Standard

- That amount of information that would lead a reasonable person to believe the action requested may be warranted.

Threats Analysis: Five Factors

1. Present or threatened destruction, modification, or curtailment of habitat or range
2. Over-utilization for commercial, recreational, scientific, or educational purposes
3. Disease or predation
4. Inadequacy of existing regulatory mechanisms
5. Other natural or manmade factors affecting its continued existence.

Not Substantial Finding

- Final agency action

Substantial Finding

- Opens a 60 day information solicitation period
- Proceed with Status Review

Petition to Delist the Bone Cave Harvestman (*Texella reyesi*)

Status of the Species in Petition:

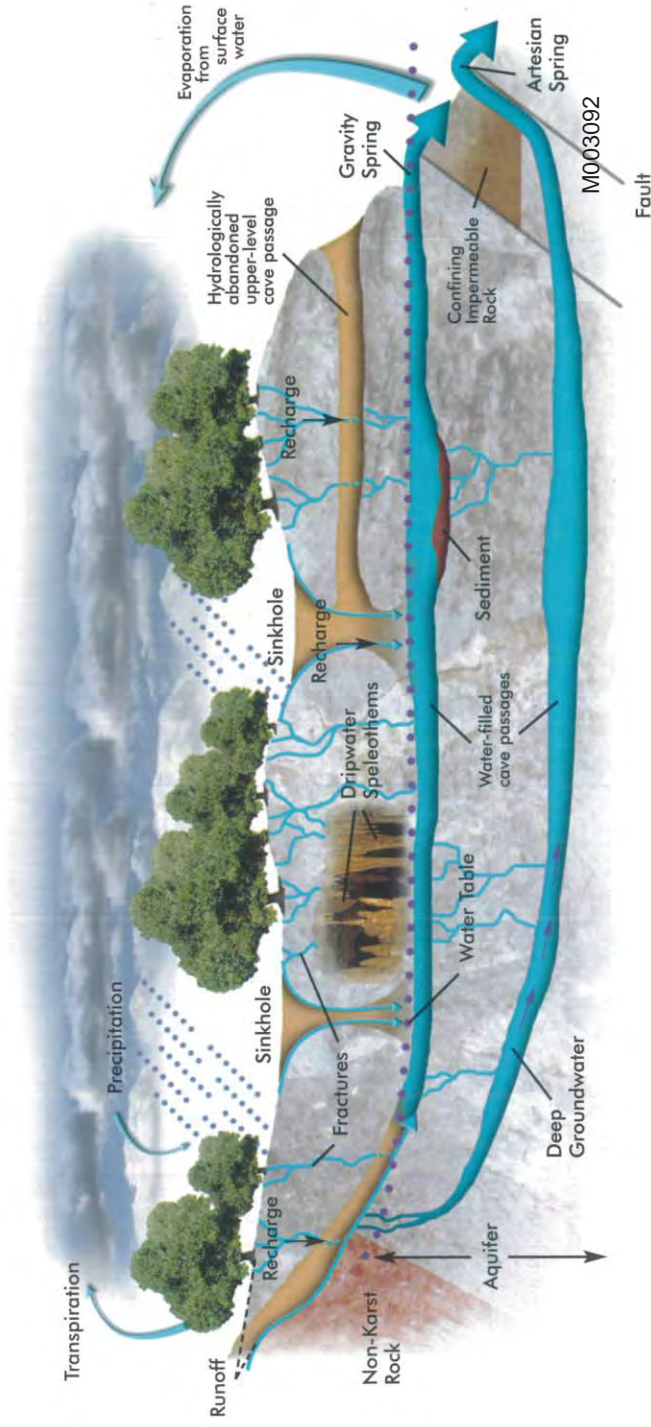
- Increase in known localities from 5 or 6 at the time of listing to 172.
- Significant conservation is in place with at least 94 known localities (55% of the total known localities) currently protected in preserves, parks, or other open spaces.
- Regulatory protections are afforded to most caves in Travis and Williamson counties via state laws and regulations and local ordinances.
- Biologists continue to discover new, occupied localities and this trend is likely to continue as more areas are explored and more caves are discovered.

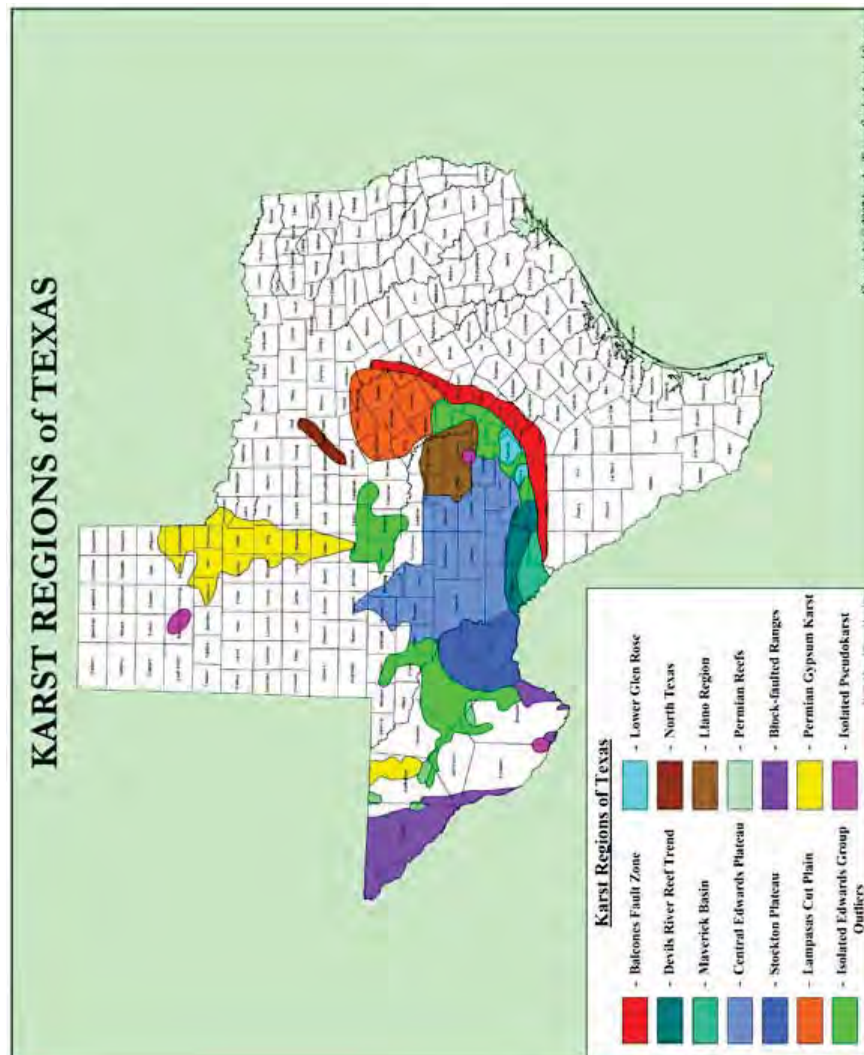
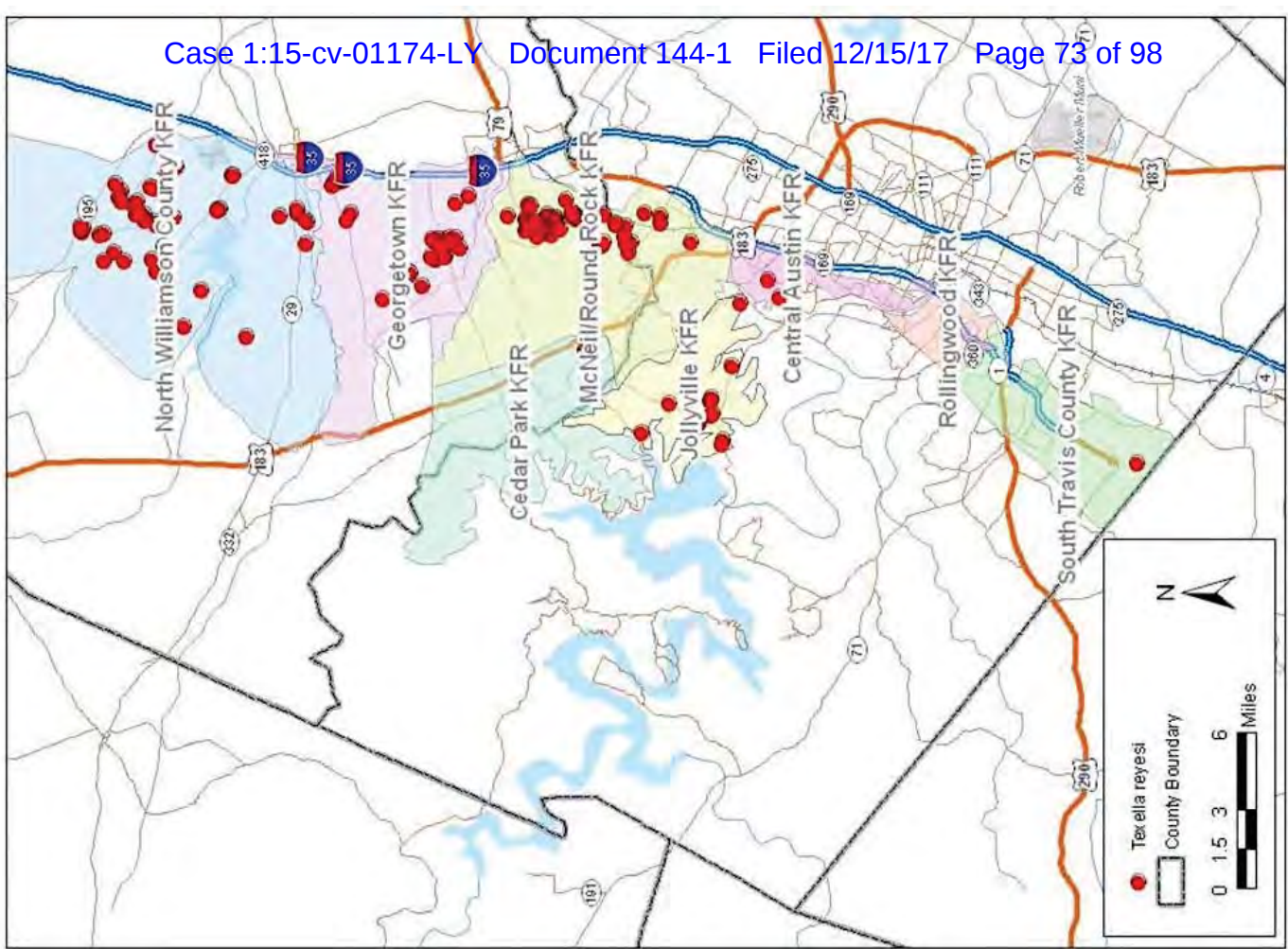
Review of Endangered Species Act Listing Factors in Petition:

- Development activities on the surface may not result in the significant loss or degradation of habitat as originally thought.
- Fire ants may not present as significant or as lasting of a threat to the species as originally believed.
- Other regulatory measures are contributing to the conservation of the species outside of the protections afforded by the ESA.
- The use of small voids or “mesocaverns” within the geologic formations known to support occupied caves mitigates the potential threat of climate change.

Biology of the Bone Cave Harvestman (*Texella reyesi*)

- Restricted to subterranean environments (troglobite)
- Exhibits morphological adaptations to that environment
 - Elongated appendages
 - Loss of eyes and pigment
- Habitat includes caves and mesocavernous voids in karst limestone
- Restricted to Travis and Williamson Counties, Texas
 - Region of Texas with high karst invertebrate endemism and species diversity
- Depends on high humidity, stable temperatures, and nutrients derived from surface
- Subterranean ecosystem is very dependent on the condition of overlying surface habitat
- Harvestmen are predaceous upon small or immature arthropods
 - Cave crickets serve important role in energy input and exchange (prey item)
- Low metabolic and reproductive rates; relatively long-lived
- Difficult to detect





Bone Cave Harvestman (*Texella reyesi*) Status

Listed as endangered in 1988 based on the threats of:

- Habitat loss to development
- Cave collapse or filling
- Alteration of drainage patterns
- Alteration of surface habitat:
 - Changes in plant and animal community composition
 - Changes in competition for limited resources resulting nutrient depletion
 - Loss of native vegetative cover leading to changes in surface microclimates, erosion
- Contamination, including groundwater, from nearby agricultural disturbance, pesticides, and fertilizers
- Leakages and spills of hazardous materials from vehicles, tanks, pipelines, and other urban or industrial runoff
- Human visitation, vandalism, and dumping
- Mining; quarrying (limestone); or, blasting above or in caves

Recovery Plan - 1994

- Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, TX
- Downlisting and delisting criteria have not yet been met (three karst fauna areas per karst fauna region).

5-year Review - 2009

- Recommended that species remain listed as endangered

Review of Threat Factors

Species Distribution and Protective Status of Populations

Petition:

- There are now more known occupied locations identified for this species, with 94 karst preserve areas currently providing significant conservation.

90-day Finding:

- 168 known locations when the 2009 5-year review was completed.
- Increase likely reflects an increase in our knowledge, not a true increase in the number of populations or range; however, *species are listed under the ESA based on threats and not just the number of sites or size of the range.*
- Status of all known locations assessed in five-year review, 21 of 168 areas appeared to have ability to meet preserve design criteria.
- Information lacking on whether those 21 areas have adequate undeveloped acreage, management, or protection mechanisms to ensure the long-term protection and survival of species.
- Amount of protected karst fauna areas still falls short (five of 18 needed) of the criteria for reclassification from endangered to threatened.
- Five of 18 needed protected karst fauna areas currently meet preserve design criteria.
- Four protected areas of three needed occur in the North Williamson County Karst Fauna Region and one of three needed in the Jollyville Plateau Karst Fauna Region. Four other karst fauna areas where species occurs have no protected karst fauna areas.

M003095

Review of Petition and Threat Factors

Factor A: The present or threatened destruction, modification, or curtailment of the species' habitat or range

Petition:

- Development activities on the surface may not result in the significant loss or degradation of species habitat as originally thought.
- Evidence of this is the species' persistence in caves surrounded by developed areas.

90-day Finding:

- Studies from central Texas caves indicate that urbanization can reduce karst invertebrate populations through reduced nutrient input.
- Population response to impacts is difficult to detect - species characterized by low metabolic and reproductive rates, long life spans, and low sample sizes.
- Populations may be declining or threatened even though they are still observed at a specific site.
- Information adequate to detect population trends for this species is not readily available and was not provided in the petition.
- Travis and Williamson Counties among fastest growing counties in the United States.
 - Travis County population projection: 1,024,266 in 2010 to 1,990,820 in 2050
 - Williamson County population projection: 422,679 in 2010 to 2,015,294 in 2050

Review of Petition and Threat Factors

Factor A: The present or threatened destruction, modification, or curtailment of the species' habitat or range

Petition:

- The petition provides examples of caves where the species can persist in developed areas.

90-day Finding:

- The petition did not provide data adequate to assess trends in the karst invertebrate populations since the development occurred.
- Although the species may be present in these caves, this does not ensure their populations are robust and secure.
- Populations may still be declining, and are at risk due to competition with surface-dwelling invertebrates and other threats associated with development such as the potential for contamination.

Petition:

- The petition states that since the species uses mesocaverns, it is protected from surface development activities because mesocaverns are “geologically protected.”

90-day Finding:

- Mesocaverns are subject to rapid permeation of surface water, and karst landscapes are particularly susceptible to groundwater contamination because water penetrates rapidly through bedrock conduits providing little or no filtration.

Review of Petition and Threat Factors

Factor B: Overutilization for commercial, recreational, scientific, or educational purposes

- The petition and our review of the information in our files did not identify any threats under this factor.

90-day Finding

- The 1988 listing rule did not identify any threats under this factor.

Factor C: Disease or predation

- The petition states that “Recent studies suggest that fire ants may not present as significant or as lasting of a threat to the species as originally believed.” Petitioners reference Morrison (2002) that found that arthropod communities had rebounded to pre-red imported fire ant-invasion levels in their study area.

90-day Finding

- Morrison (2002) also states that “it is quite likely that red imported fire ants did contribute directly or indirectly to the disappearance or reduction in numbers of species” and that their study “should not be interpreted as an indication that detrimental effects of invasive ants will simply disappear with time.”
- Red-imported fire ants have been found within and near many caves in central Texas and have been observed feeding on dead troglobites, cave crickets, and other species within caves.

Review of Petition and Threat Factors

Factor D: The inadequacy of existing regulatory mechanisms:

Petition:

- “...the regulatory landscape includes a number of measures contributing to the conservation of the species outside of the protections afforded by the ESA.” Examples provided are from City of Austin, City of Georgetown, and Texas Commission on Environmental Quality.

90-day Finding:

- The City of Austin’s Environmental Criteria Manual provides a 150- to 300-ft set-back area around caves. Those distances are not adequate to meet our preserve design criteria, do not protect the cave cricket foraging area, and potentially do not include the surface and subsurface drainage basins.
- The City of Georgetown Water Quality Management Plan provides protection for sites occupied by the Georgetown salamander. No Bone Cave harvestmen occur in close enough proximity to salamander sites to benefit.
- Texas Commission on Environmental Quality practices provide protection from water quality impacts; others, such as sealing cave entrances for water quality reasons, can harm karst invertebrates. In addition, not all of the caves that the species occurs in are considered recharge features and, therefore, would not receive some of the water quality protection measures.

Review of Petition and Threat Factors

Factor E: Other natural or manmade factors affecting the continued existence of the species

Petition:

- “Inner Space Cavern demonstrates that the species can persist in caves with frequent human visitation and may be more tolerant of related habitat modification than originally believed.”
- They also provide other caves as examples of sites that have experienced human use yet the species persists.

90-day Finding:

- No detailed information was provided to demonstrate if these caves experienced continued human use. In addition, the petition provided no trend analysis for these caves.
- Observation of the species in these locations does not mean the populations at these locations have not been impacted or can withstand the long-term impacts of development or human visitation.

Review of Petition and Threat Factors

Factor E: Other natural or manmade factors affecting the continued existence of the species

Petition:

- The petitioners state that “the use of small voids or “mesocaverns” within the geologic formations known to support occupied caves mitigates the potential threat of climate change.”

90-day Finding:

- The presence of mesocaverns alone will likely not be sufficient to ameliorate all of the effects that climate change may pose to this species.
- Karst invertebrates depend on stable temperatures and high humidity.
- If average surface temperatures increase, this could result in increased in-cave temperatures, which could affect the species.
- Drier and less suitable conditions in caves will likely cause the species to retreat farther into mesocaverns and away from nutrients located in larger cave passages.
- Caves in arid regions have been shown to have smaller invertebrate populations and diversity due to less moisture and nutrient availability.

Summary

- Information indicates criteria for reclassification have not been met.
- The petitioners based their assessment that the species can thrive in developed areas on information previously reviewed by the Service (2009 5-year review).
- Urbanization and human population growth and development continue to represent a threat to the species.
- No trend analyses were provided to indicate this species can withstand the threats associated with development, urbanization, or climate change over the long-term.
- Although additional populations have been identified since the 5-year review, these sites are not adequately protected and do not meet our preserve design criteria.
- We find that the petition does not present substantial scientific or commercial information indicating that delisting of the species is warranted.

Defense Exhibit 14

Briefing: 90-day Finding to Delist the Bone Cave Harvestman



Southwest Region, Austin Ecological Services Field Office

M003264

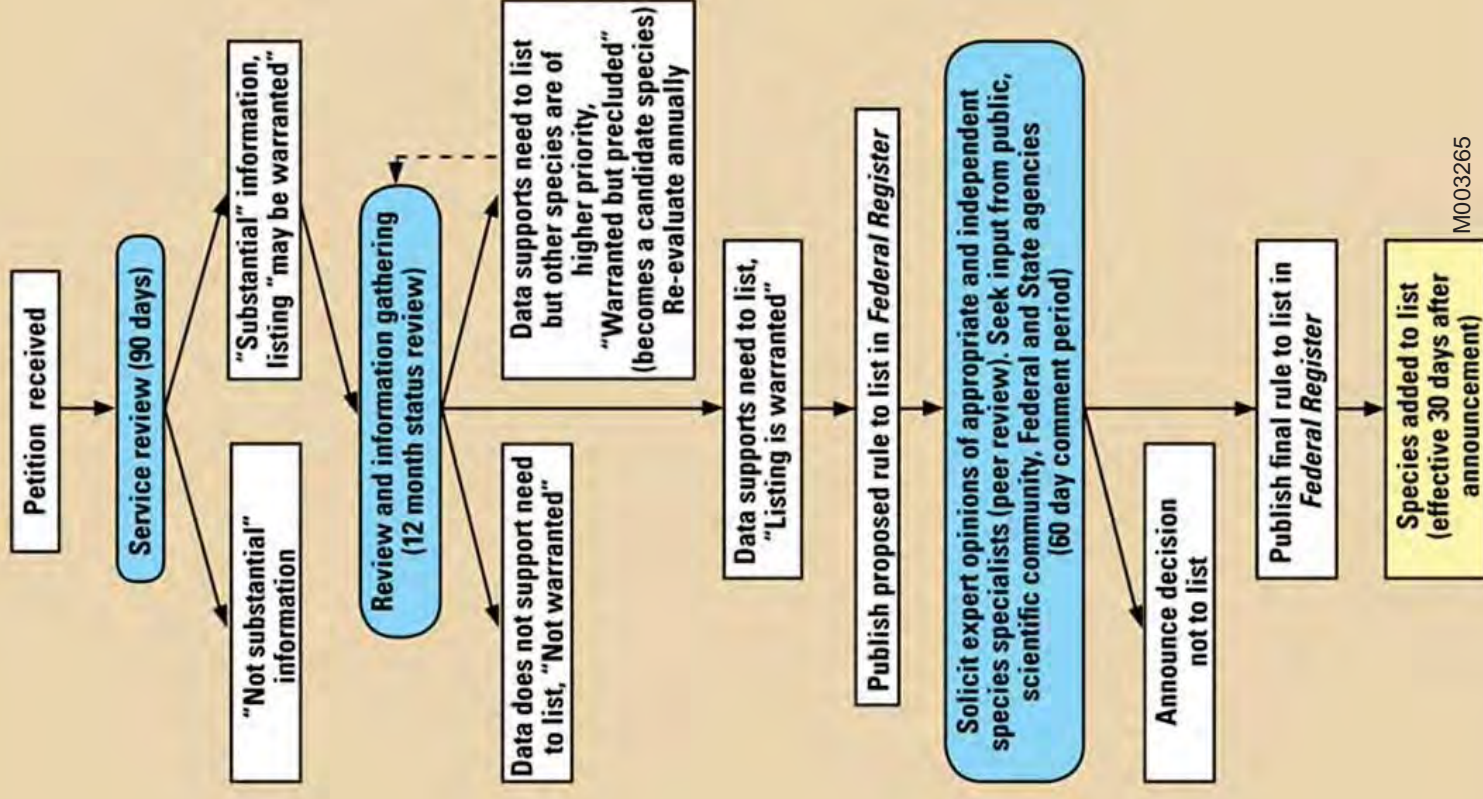
Endangered Species Act

Petition Process – Section 4(b)(3)

- Section 4(b)(3) of ESA allows public participation in listing /delisting/ reclassification process
- Defined statutory time-frames

90-day Evaluation

- It is appropriate for us to consider information readily available to evaluate whether the informational that a petition presents is substantial. Courts have overturned decisions that sought and relied upon outside data.
- We should not use information outside of the petition to supplement a petition.



M003265

Evaluation of 90-day Finding

Substantial Information Standard

- The FWS must evaluate whether the information in the petition is substantiated and not mere speculation or opinion.
- The petition should contain substantial scientific or commercial information in support of the petition's claims such that a reasonable person conducting an impartial scientific review would conclude that the action proposed in the petition may be warranted.
- The hypothetical person evaluating the information in the petition would need to perceive that the information is credible; conclusions drawn in the petition without the support of credible scientific or commercial information will not be considered "substantial information."

Threats Analysis: Five Factors

1. Present or threatened destruction, modification, or curtailment of habitat or range
2. Over-utilization for commercial, recreational, scientific, or educational purposes
3. Disease or predation
4. Inadequacy of existing regulatory mechanisms
5. Other natural or manmade factors affecting its continued existence.

Not Substantial Finding

- Final agency action

Substantial Finding

- Solicits information for the status review
- Proceeds with Status Review

Petition to Delist the Bone Cave Harvestman (*Texella reyesi*)

Petition asserts the status of the species is as follows:

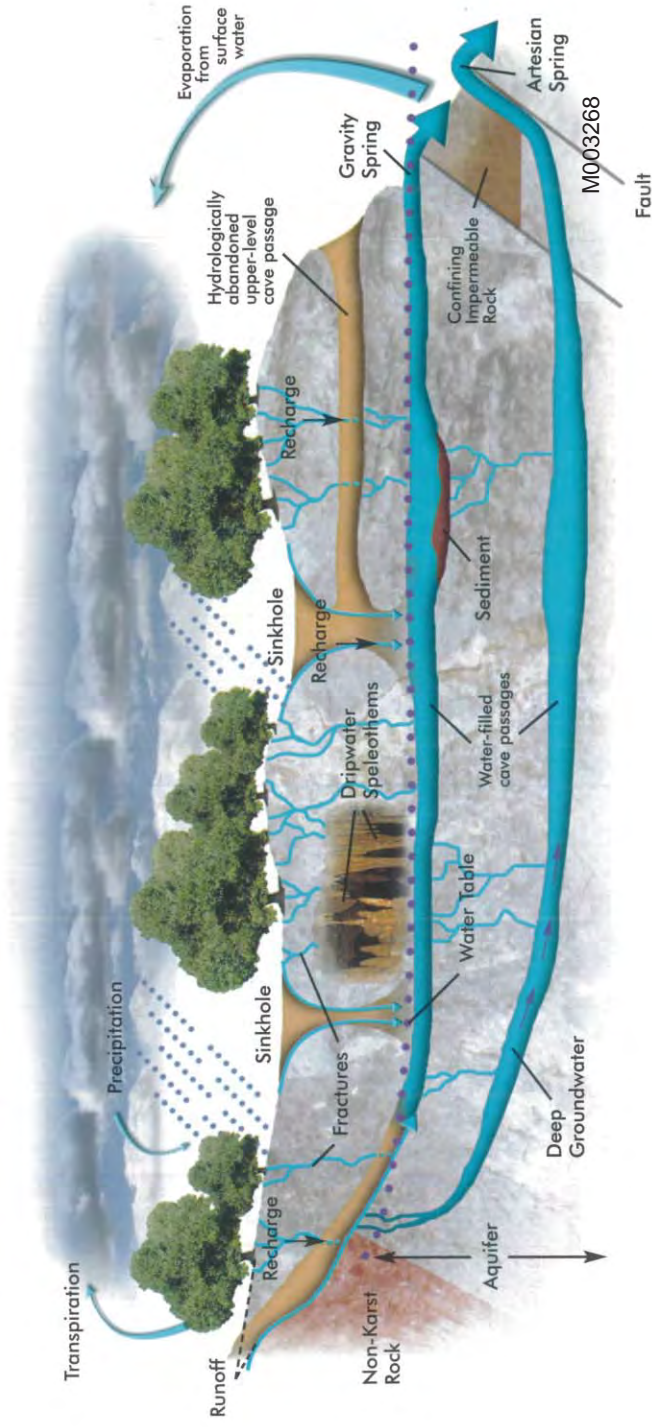
- Increase in known localities from 5 or 6 at the time of listing to 172.
- Significant conservation is in place with at least 94 known localities (55% of the total known localities) currently protected in preserves, parks, or other open spaces.
- Regulatory protections are afforded to most caves in Travis and Williamson counties via state laws and regulations and local ordinances.
- Biologists continue to discover new, occupied localities and this trend is likely to continue as more areas are explored and more caves are discovered.

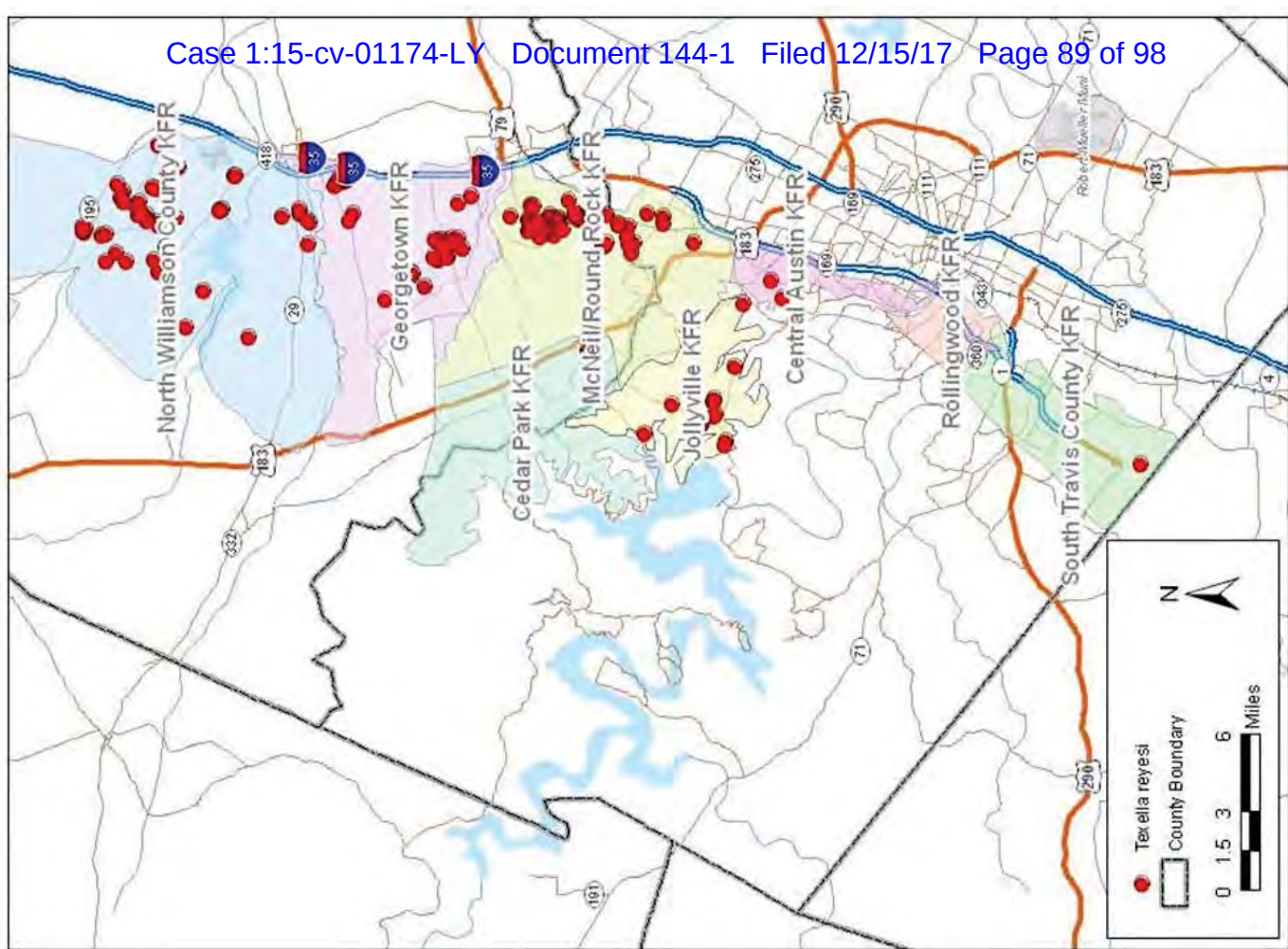
Petition asserts the Endangered Species Act Listing Factors are as follows:

- Development activities on the surface may not result in the significant loss or degradation of habitat as originally thought.
- Fire ants may not present as significant or as lasting of a threat to the species as originally believed.
- Other regulatory measures are contributing to the conservation of the species outside of the protections afforded by the ESA.
- The use of small voids or “mesocaverns” within the geologic formations known to support occupied caves mitigates the potential threat of climate change.

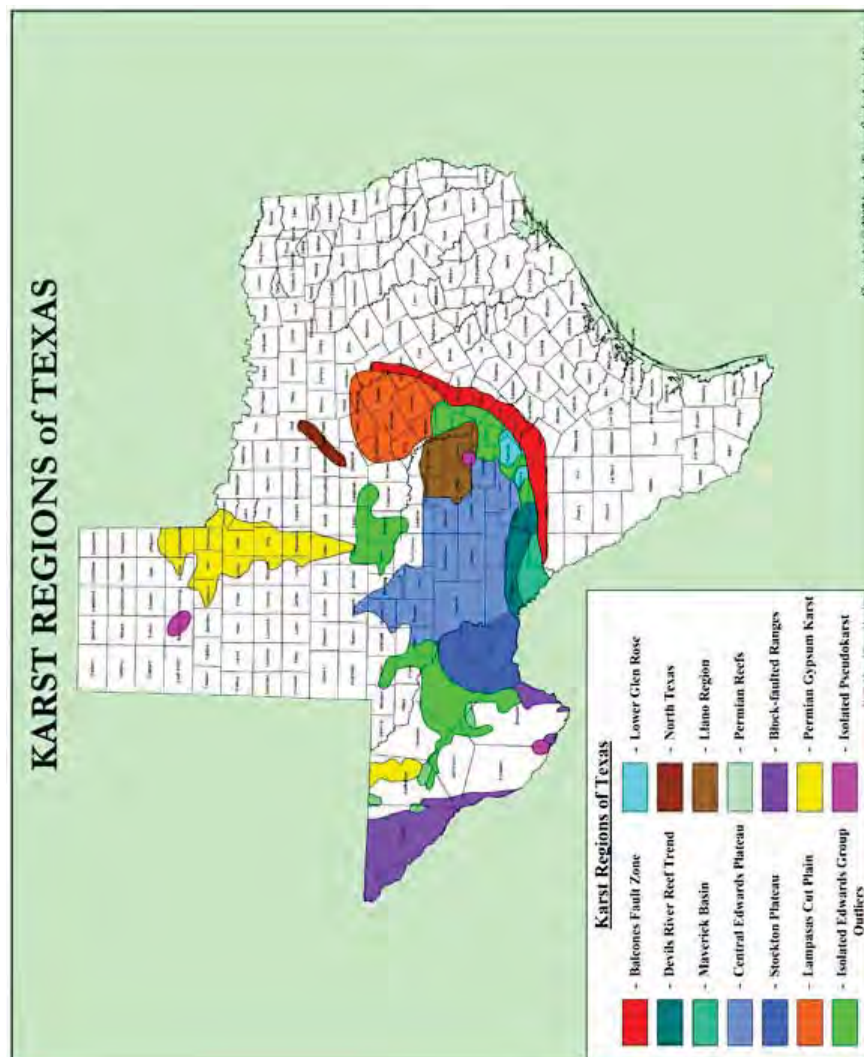
Biology of the Bone Cave Harvestman (*Texella reyesi*)

- Restricted to subterranean environments (troglobite)
- Exhibits morphological adaptations to that environment
 - Elongated appendages
 - Loss of eyes and pigment
- Habitat includes caves and mesocavernous voids in karst limestone
- Restricted to Travis and Williamson Counties, Texas
 - Region of Texas with high karst invertebrate endemism and species diversity
- Depends on high humidity, stable temperatures, and nutrients derived from surface
- Subterranean ecosystem is very dependent on the condition of overlying surface habitat
- Harvestmen are predaceous upon small or immature arthropods
 - Cave crickets serve important role in energy input and exchange (prey item)
- Low metabolic and reproductive rates; relatively long-lived
- Difficult to detect





M003269



Bone Cave Harvestman (*Texella reyesi*) Status

Listed as endangered in 1988 based on the threats of:

- Habitat loss to development
- Cave collapse or filling
- Alteration of drainage patterns
- Alteration of surface habitat:
 - Changes in plant and animal community composition
 - Changes in competition for limited resources resulting nutrient depletion
 - Loss of native vegetative cover leading to changes in surface microclimates, erosion
- Contamination, including groundwater, from nearby agricultural disturbance, pesticides, and fertilizers
- Leakages and spills of hazardous materials from vehicles, tanks, pipelines, and other urban or industrial runoff
- Human visitation, vandalism, and dumping
- Mining; quarrying (limestone); or, blasting above or in caves

Recovery Plan - 1994

- Recovery Plan for Endangered Karst Invertebrates in Travis and Williamson Counties, TX
- Downlisting criteria have not yet been met (three karst fauna areas per karst fauna region; six total karst fauna regions for a total of 18 karst fauna areas).

5-year Review - 2009

- Recommended that species remain listed as endangered

Review of Threat Factors

Species Distribution and Protective Status of Populations

Petition:

- There are now more known occupied locations identified for this species, with 94 karst preserve areas currently providing significant conservation.

90-day Finding:

- 168 known locations when the 2009 5-year review was completed.
- Status of all known locations assessed in five-year review, over 20 (of 168 areas) appeared to have ability to meet preserve design criteria.
- Information lacking on whether those areas have adequate undeveloped acreage, management, or protection to ensure long-term survival of species as part of recovery plan.
- Amount of protected karst fauna areas falls short (five karst fauna areas) of the criteria for reclassification from endangered to threatened.

Review of Petition and Threat Factors

Factor A: The present or threatened destruction, modification, or curtailment of the species' habitat or range

Petition:

- Development activities on the surface may not result in the significant loss or degradation of species habitat as originally thought.
- Evidence of this is the species' persistence in caves surrounded by developed areas.

90-day Finding:

- Studies from central Texas caves indicate that urbanization can reduce karst invertebrate populations through reduced nutrient input
- Population response to impacts is difficult to detect - species characterized by low metabolic and reproductive rates, long life spans, and low sample sizes.
- Populations may be declining or threatened even though they are still observed at a specific site.
- Travis and Williamson Counties among fastest growing counties in the United States.
 - Travis County population projection: 1,024,266 in 2010 to 1,990,820 in 2050
 - Williamson County population projection: 422,679 in 2010 to 2,015,294 in 2050

Review of Petition and Threat Factors

Factor A: The present or threatened destruction, modification, or curtailment of the species' habitat or range

Petition:

- The petition provides examples of caves where the species can persist in developed areas.

90-day Finding:

- The petition did not provide information not considered in the development of our recovery planning process and preserve design.
- Although the species may be present in these caves, this does not demonstrate their populations are robust and secure.
- Populations may still be declining, and are at risk due to competition with surface-dwelling invertebrates and other threats associated with development such as the potential for contamination.

Petition:

- The petition states that since the species uses mesocaverns, it is protected from surface development activities because mesocaverns are “geologically protected.”

90-day Finding:

- Mesocaverns are subject to rapid permeation of surface water
- Karst landscapes are particularly susceptible to groundwater contamination because water penetrates rapidly through bedrock conduits providing little or no filtration

Review of Petition and Threat Factors

Factor B: Overutilization for commercial, recreational, scientific, or educational purposes

- The petition and our review of the information in our files did not identify any threats under this factor.

90-day Finding

- The 1988 listing rule did not identify any threats under this factor.

Factor C: Disease or predation

- The petition states that “Recent studies suggest that fire ants may not present as significant or as lasting of a threat to the species as originally believed.” Petitioners reference Morrison (2002) that found that arthropod communities had rebounded to pre-red imported fire ant-invasion levels in their study area.

90-day Finding

- Morrison (2002) also states that “it is quite likely that red imported fire ants did contribute directly or indirectly to the disappearance or reduction in numbers of species” and that their study “should not be interpreted as an indication that detrimental effects of invasive ants will simply disappear with time.”
- Red-imported fire ants have been found within and near many caves in central Texas and have been observed feeding on dead troglobites, cave crickets, and other species within caves

Review of Petition and Threat Factors

Factor D: The inadequacy of existing regulatory mechanisms:

Petition:

- “...the regulatory landscape includes a number of measures contributing to the conservation of the species outside of the protections afforded by the ESA.” Examples provided are from City of Austin, City of Georgetown, and Texas Commission on Environmental Quality.

90-day Finding:

- The City of Austin’s Environmental Criteria Manual provides a 150- to 300-ft set-back area around caves. Those distances are not adequate to meet our preserve design criteria in recovery plan.
- The City of Georgetown Water Quality Management Plan provides protection for sites occupied by the Georgetown salamander. No Bone Cave harvestmen occur in close enough proximity to salamander sites to benefit.
- Texas Commission on Environmental Quality practices provide protection from water quality impacts; others, such as sealing cave entrances for water quality reasons, can harm karst invertebrates.

Review of Petition and Threat Factors

Factor E: Other natural or manmade factors affecting the continued existence of the species

Petition:

- “Inner Space Cavern demonstrates that the species can persist in caves with frequent human visitation and may be more tolerant of related habitat modification than originally believed.”
- They also provide other caves as examples of sites that have experienced human use yet the species persists.

90-day Finding:

- Observation of the species in these locations does not mean the populations at these locations have not been impacted or can withstand the long-term impacts of development or human visitation.

Review of Petition and Threat Factors

Factor E: Other natural or manmade factors affecting the continued existence of the species

Petition:

- The petitioners state that “the use of small voids or “mesocaverns” within the geologic formations known to support occupied caves mitigates the potential threat of climate change.”

90-day Finding:

- Karst invertebrates depend on stable temperatures and high humidity.
- If average surface temperatures increase, this could result in increased in-cave temperatures, which could affect the species.
- Drier and less suitable conditions in caves will likely cause the species to retreat farther into mesocaverns and away from nutrients located in larger cave passages.
- Caves in arid regions have been shown to have smaller invertebrate populations and diversity due to less moisture and nutrient availability.

Summary

- Information indicates criteria for downlisting have not been met.
- The petitioners based their assessment that the species can thrive in developed areas on information previously reviewed by the Service (2009 5-year review).
- Urbanization and human population growth and development continue to represent a threat to the species.
- Although additional populations have been identified since the 5-year review, these sites are not adequately protected and do not meet our preserve design criteria.